

FOODLE  
ON  
YOUR 100

# PORTABLE 100

The magazine for  
Model 100 users

A Free  
Spreadsbeet  
for Your MEWS

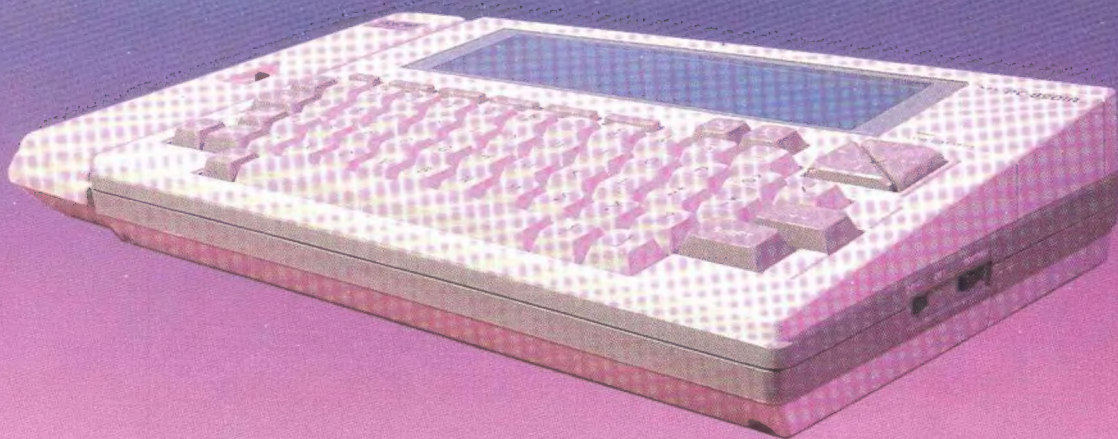
F) @SUM(B1,B4)

B	5	A	B	C	D
0	Item	Pct by wt	Cost/lb	Cost/can	
1	Peanuts	60	0.338	0.203	
2	Pecans	10		0.000	
3	Cashews	5		0.000	
4	Almonds	25		0.000	
5	Total	100			

DUMP YOUR LCD TO YOUR PRINTER







# NEC 32K *VS.* SIDECAR 128K

**Up To 192K Of Memory On-line For Your NEC PC-8201 Means Goodbye To Unreliable Cassettes, And Bulky Disk Drives.**

The problem with most portables is utility gets sacrificed for portability. Only being able to take 32K of files with you is a real pain. Things like form letters, data bases, spreadsheet layouts, and other files have to either be left behind or you have to mess with external storage devices. The inconvenience of having to bring along cassette players, and disk drives (not to mention the hassle getting them to work) can make you wonder why you brought this "productivity tool" in the first place.

## **THE NEC SOLUTIONS**

The NEC PC-8201 has two solutions for this problem. First it has the ability to house up to 64K of RAM inside the machine. Through a technique called "bank switching" you can access up to three different 32K "banks" of memory: two inside the computer and one in a plug-in cartridge. This is a big improvement. But the problem here is each additional 32K cartridge from NEC costs \$395.

## **PURPLE'S SOLUTION**

Many of you will remember us as the first company to manufacture an aftermarket 8K memory module for installation inside the computer. This product was so successful that other companies copied it. Our customers

kept asking for more storage, and the result is our SideCar™. It uses a bank switching system similar to NEC's to let you access up to *four additional banks of 32K, giving the NEC PC-8201 up to 192K of on-line memory!* Now there really is a portable computer of amazing proportions.

## **THE PORTABLE SOLUTION**

Now you can have gobs of data instantly available at the flick of a switch. The SideCar™ plugs into the NEC PC-8201 in the same slot the NEC 32K cartridge uses. The memory is powered by two standard size AA batteries when the computer is not in use. You can even change the batteries without losing the data. SideCar™ comes standard with 32K of memory, with up to three additional 32K modules available giving it a total capacity of 128K. They are simple plug-in options so you can buy a 32K version now and add memory as needed. The batteries will support the memory for up to one year.

## **NO RISK OFFER**

We give you a 30 day satisfaction guarantee and a 1 year warranty on your SideCar™. If you are not completely satisfied for any reason, we will refund the entire amount of your

purchase. If at any time during the one year warranty period your SideCar™ requires service, we will fix or replace it within 48 hours.

## **THE BOTTOM LINE**

The basic 32K SideCar™ with 32K in bank 1, expandable to 128K, is \$349 (Part #SC32). User installable 32K banks are \$145 for bank 2 (Part #SCB2), and \$175 each for bank 3 and 4 (Part #SCB34). If ordered together the banks are installed and tested at the factory.

Price includes shipping, and insurance in the continental USA. Your SideCar™ will be shipped the next business day via UPS surface freight. If you want 2nd day air service, just add \$4. No extra charge for VISA/Mastercard, or American Express. For fastest delivery send certified checks or credit card. Calif. residents add 6% sales tax. Personal check take 3 weeks to clear. Call for purchase order information.

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## **PURPLE COMPUTING**

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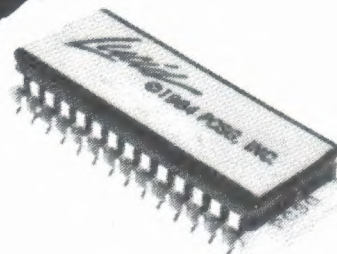
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Not only a spreadsheet, but a program generator as well.  
So good we sell it on a satisfaction guaranteed 30 day trial.

# Lucid<sup>©</sup>



**Appears on MAIN MENU like a built-in!**  
on Snap-in<sup>™</sup> ROM. Takes no  
memory to store or for operating  
overhead. All RAM is available for  
data storage.

## IS HERE!

LUCID<sup>©</sup> is truly the spreadsheet plus.  
The result of a splendid, exhaustive  
research and development program to  
produce the fastest, most feature-rich  
spreadsheet for the Model 100 that gives  
you capabilities you cannot equal with  
Multiplan\* or even Lotus 1-2-3\*\*.

**\$149.95.**

**Portable Computer Support Group, Inc.  
11035 Harry Hines Blvd., #207, Dallas, Tx. 75229  
First with software for the Model 100. 1-214-351-0564**

\*Registered trademark Microsoft Corp.  
\*\*Registered trademark Lotus Corp.

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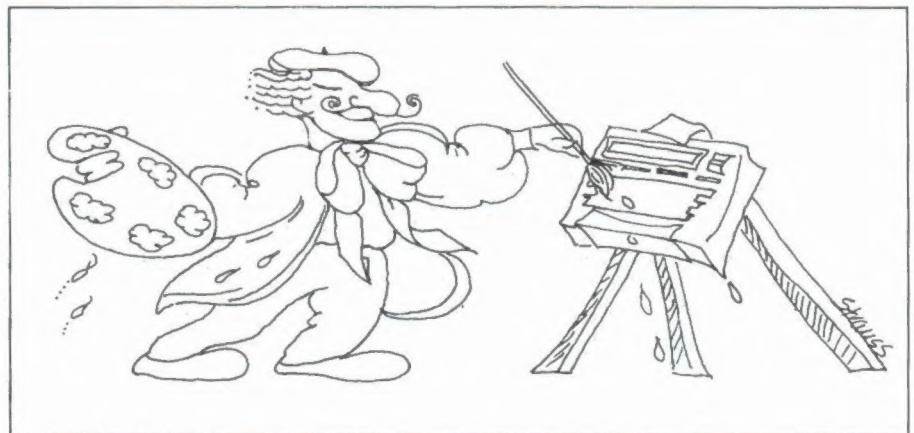
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ISSN 0738-7016







**Anyone who experiences LUCID® won't settle for anything else.**

**Lucid**®  
**on Snap-In™ ROM**

**is an advanced  
spreadsheet that  
is a program  
generator as well.**

**Changes your Model 100 into a totally different  
computer with capability you never thought possible.**

**PCSG says "Satisfaction Guaranteed  
or your money back within 30 days!"**

PCSG was the first to develop software for the Model 100. That was back in April of '83. We could have rushed out onto the market with an inferior spreadsheet, but we chose to undergo a significant development and produce a spreadsheet for the Model 100 that would truly be world class. A spreadsheet that would rival Lotus 1-2-3\*.

LUCID® is here now. It is on a ROM cartridge that snaps into the compartment on the back of your Model 100. It takes no memory to load and no memory for operating overhead. That means you have the full 29.6k bytes free to store your data.

LUCID® is amazing in so many ways. First of all, it is memory conserving. It will let you build a large spreadsheet—255 row by 126 column capacity. Where other spreadsheets actually consume 4 to 5 bytes for an unused cell, LUCID® uses no memory for empty cells. This lets you build huge spreadsheets in

your Model 100's RAM that could consume 80 to 100K on a desktop computer.

Secondly, LUCID® is fast. Whenever you ask other spreadsheets to calculate a file of any size, you can get up and go get a cup of coffee before they are through. LUCID® is so rapid, a 36 column corporate financial statement took less than 4 seconds to calculate.

Thirdly, LUCID® has features you won't find in most other spreadsheets. For example, when you type a label (text) it will cross column boundaries, in other words when you type a label or title it will appear as you type it irrespective of column of width. LUCID® also allows you to set column widths individually, and of course LUCID® has insert row and insert columns, as well as other standard features. LUCID® even lets your formulas refer to cells in other spreadsheet files. Further, LUCID® has what no other spreadsheet has: Cut,

Copy, and Paste. It uses the same keys as Cut and Paste in TEXT, but here's the difference: it takes all the formulas with it when you paste and they all automatically recalculate with the entire sheet.

And here is what is really amazing. You can copy or cut from one spreadsheet and paste into another spreadsheet or even a TEXT file.

LUCID® supports all BASIC math functions as well as Log, sine, cosine, tangent, exponentiation and other sophisticated math functions.

LUCID® has so many features that you will say "this is what I need in a spreadsheet", such as automatic prompting of an incorrectly typed-in formula showing just where the mistake was made.

LUCID® has expanded "go to" functions that remember and produce a windowing capability. It has a special block definition capacity that makes many other



features possible that refer to whatever section of the spreadsheet you designate. LUCID® has many enhancements that make it easy to use. Once anyone begins to use it they say "this is the way a spreadsheet ought to work".

In the same fashion as TEXT creates ".DO" or document files, LUCID creates ".CA" or calc-sheet files. In the same way you can get into any document file just by putting the wide bar cursor on the filename from the main menu, when you put the cursor on any ".CA" file, you are immediately working on that sheet.

But perhaps most remarkable is that LUCID® is not only a spreadsheet but a program generator as well. First, LUCID® lets you protect all cells against entry or change, and then unprotect just the cells you want for someone else to use as input fields.

Combined with the spill-over length feature, you can design input questions such as "What is your name?, What is your age?, Choose which applies to you: a) TALL b) MEDIUM c), SHORT, Type in the state where you were born". You can provide complete on screen instructions for use. This lets you create a series of prompts so that you can have a person totally unfamiliar with computers, entering information that you want to process, to create a personalized report based on calculations made using the facts and numbers they put in.

You see, LUCID® will not only process values, but text input as well so that the facts other than numbers can be responded to. LUCID® has the ability for you to refer in a formula to cells containing words. This feature combines with the capacity of doing "if then" statements that work by doing table look-ups against even massive X/Y charts of text or numerical information. A simple example based on the inputs

illustrated above would be to report the recommended calcium intake for tall people based on their age. You can make even more specific inquiries and reports, such as recommended amount of Aerobic exercise based on age and weight. Answers can be values or words depending on the situation, eq. 150 lbs., 25 years might be "30 minutes" but 280 lbs., 50 yrs might be "Warning: Aerobic exercise could be dangerous". You can produce a program that responds to inputs with no programming knowledge whatsoever.

You can prepare a report section in your spreadsheet with instructions to your user for printout, and they can produce a personalized printout that responds to their input. All your formulas and tables that did the calculations and provided the facts are invisible to that user. LUCID® is useful for doctors for patient questionnaires, trouble-shooting technicians, purchase clerks, people doing job quotes, stores for customer workups, insurance agents and anybody who needs to process specific facts and numbers to produce a report based on those responses.

LUCID® comes with a manual that explains not only the characteristics of LUCID®, but will train you how to use a spreadsheet even if you have never seen one before. You are shown how to do budgets, forecasts, breakeven analysis amortizations and many other types of personal and business reports and calculations.

User friendly is such an over-used term in this industry, but we can tell you that everyone who uses LUCID®, who has experienced any other spreadsheet, says that LUCID® is amazingly easy to use. A typical comment has been "I have never seen a spreadsheet that does so much, and yet LUCID® is so much easier and faster to use."

LUCID® is a result of a most exhaustive developmental effort in which PCSG's objective was to develop a spreadsheet that was better than the state-of-the-art. We are so pleased because LUCID® provides for the Model 100 spreadsheet capability you cannot equal on a desktop computer. Plans are underway to offer LUCID® someday for larger computers, but for now TRS 80 Model 100 owners have the good fortune of having this powerful exciting ROM program exclusively.

LUCID® is the easiest to use, fastest and yet most feature-rich spreadsheet, with capability that takes it far beyond the definition of a mere spreadsheet. We are so excited about LUCID®, because it changes the Model 100 into a totally different computer with power and function most never dreamed possible.

LUCID® is, in our opinion and that of those who have examined it, a breakthrough. We sell it on a 30 day trial. If you are not completely satisfied, return it within 30 days for a full refund. Priced at \$149.95, on snap-in ROM. Mastercard, Visa or COD.

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First with  
software for  
the Model 100

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PCSG provides hotline software support for Model-100. Call 1-214-351-0564. Available now directly from Portable Computer Support Group. We endeavor to continue as The Leader in Software for the Model 100.





## SPEC COMPARISON

	Lucid	1,2,3	Multiplan	Visicalc
Cut and paste into other spreadsheets or TEXT	Y	N	N	N
Individually variable column widths	Y	Y	Y	N
References to labels in formulas	Y	N	N	N
# Rows	254	2048	255	254
# Cols	126	255	63	63
References to cells in other spreadsheets	Y	Y	Y	N
Two dimensional table lookups	Y	N	N	N
Cell protection	Y	Y	Y	N
Redirectable output	Y	Y	—	N
Long labels spill over column boundaries	Y	Y	N	N
Insert row / col	Y	Y	Y	Y
Delete row / col	Y	Y	Y	Y
Replicate	Y	Y	Y	Y
Copy	Y	Y	Y	Y
Absolute and relative cell references	Y	Y	Y	N
Function to count cells occupied by a value	Y	N	Y	Y
SQR	Y	Y	Y	Y
SIN				
COS				
TAN				
ATN				
LOG				
EXP				
INT				
TBL (Lookup, Choose, etc.)				
RND				
SUM	These Lucid functions operate on rectangular ranges as well as individual rows and columns.			
CNT				
MAX				
MIN				
★★				
Edit keys work on initial input	Y	N	N	N
Natural order of recalculation - with detection of circular references	Y	Y	Y	N
Automatic syntax checking of input - cursor stops at your mistake	Y	N	N	N
'Wander' mode on input of formulas to 'point' to cell references	Y	Y	Y	Y
'Wander' mode on edit of formulas	Y	N	N	N
'Go to' remembers where you 'came from'	Y	N	N	N
Sort by column and row	★	Y	Y	N
Graphing of selected ranges	★	Y	N	N
Automatic insertion of date into edit line with control-D	Y	N	N	N
Super compact - empty cells take no memory	Y	N	N	N
Table lookups can use labels as keys	Y	N	N	N
Available now on Model 100	Y	N	N	N
Automatically fits wide spreadsheets to narrow paper	Y	Y	Y	N
Ability to suppress zeros on printout	Y	N	N	N
Allows multiple printer fonts in same spreadsheet	Y	N	N	N

★ Extensibility by optional personality modules, with function key access.

★★ Lucid is designed to perform by simple one time entry formulas all other functions not provided as built-in.

<b>Speed and Precision Comparison</b>				
All benchmarks performed on a spreadsheet occupied by 600 formulas. all times in seconds.				
	Lucid on Model 100	123 on IBM PC	Multiplan on IBM PC	Visicalc on IBM PC
Sum of 600 cells	2.0	1.4	11.5	7.0
Insert column	0.5	2.4	11.0	6.0
Square root 600 cells	133	12.0	112	298
Replicate 100 rows	20.0	1.5	20.0	12.0
Decimal precision	14 digits	11 digits	14 digits	12 digits

## PORTABLE COMPUTER SUPPORT GROUP

11035 Harry Hines Blvd. No. 207, Dallas, Tx. 75229

**1-214-351-0564**

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# PREVIEW

JOHN P. MELLO JR.



**W**hen Tandy released the Model 100, one of the first general purpose programs created for it by commercial software makers was a spreadsheet.

Software writers wrote the early spreadsheets in Basic. Skyline Marketing Corporation offered PortaCalc (reviewed in the October 1983 issue of *Portable 100*). American Micro Products marketed Tplan (*Portable 100*, April 1984).

Most recently those pioneering efforts in Basic have been superseded by machine-language efforts like Lucid (*Portable 100* New Products, November 1984) and Microsoft's Multiplan (this month's New Products).

**ORIGINAL SPREAD.** One of the earliest spreadsheets for the 100 was a program, written by Terry Dettman, appearing in *Basic Computing*, a magazine bought and killed by Ziff Davis. Terry, in the true spirit of the computing hobbyist, submitted his software to members of the Model 100 Special Interest Group on CompuServe.

There the program attracted a group of programmers dedicated to enhancing the spreadsheet. This group included Don Hergert, Gary Bender, Chris Young, Joel Hassel, and Woods Martin, who emerged as coordinator of the programming efforts.

After months of work, an impressive spreadsheet developed. That spreadsheet, further refined by Woods, appears in this month's *Portable 100*. Woods' article on "Spread" is the first in a series that will explain the spreadsheet's features and outline how to create overlays for it.

Because of the unusual length of Spread's listing, we've worked out (with Woods' permission) several ways of obtaining the program through telecomputing.

**COMPUSERVE.** Model 100 SIG members may download the program (SPREAD.WM) from data base 2 (XA2). For the uninitiated, here's how

to get to the program from CompuServe's main menu:

You see: !  
You type: **GO PCS-154**  
and press *enter*.  
Function:  
**XA2** *enter*  
**XA2:**  
**r SPREAD.WM**  
Press **F2** on your 100  
File to Download?  
**SPREAD** *enter enter*  
**XA2:**  
**F2**  
**off** *enter*

Spread is now in your 100 in ASCII form. It takes up about 11.5K of RAM. Take a look at the file. Make sure there aren't any stray carriage returns and remove any superfluous characters at the beginning and end of the file. Convert the program to Basic and you're ready to roll.

**SOURCE.** For Source subscribers, Spread has been uploaded to the model 100 conference on Participate. If you're new to Participate, here's how to get Spread from The Source's main menu.

Choose option 6 (Command Level) from the main menu. You will see:

->

Type in Parti and press enter.

You will be asked if you are signing on to an existing account. Since this is your first time on Parti, type N and press enter.

Parti will ask you a series of questions to configure itself to your computer and create a profile of you in its files. When you're through with this initialization process, you will see this menu:

PARTICIPATE ON THE SOURCE

1. Overview
2. Instructions
3. List Principal Conferences
4. Begin to PARTICIPATE

Choose option 4. You will see:

2 waiting notes  
Read, Scan, Other?

Type in stop and press enter. This will display the "action" prompt (ACTION-> Read, Write, Other?). Type r 84.27415 and press enter. This will take you to the Spread subconference.

After the conference header is displayed, you will see the "disposition" prompt (DISPOSITION->). Type r 1-99. Then prepare your 100 to download a file (F2, Spread, enter, enter).

When Participate finishes sending Spread to you, you will see the disposition prompt again. Press F2. Type stop and press enter. At the action prompt, type off and press enter. Once off the system, clean up the Spread file and convert it to Basic.

**80 MICRO BBS.** There is one more system containing Spread. With the kind permission of sysop Brad Dixon, 80 Micro has let us upload the program to its bulletin board. Access to this board is free. However, the board is busy, so you'll probably have to try more than once to get on it.

Set your stat parameters on your 100 to M7E1E. Then enter TELCOM and dial 603-924-6985<>.

From this system's command prompt (Command?), type X and press enter. This will get you to the system's data bases. You'll know you're in the data base when you see the access prompt (Access?).

At that prompt type D and press enter. You will be asked for the file name of the program you want to download. Type SPREAD.IMG. Then open a file in your 100 (press F2), give it a name, and hit enter twice.

"Searching" will appear on your screen and the file will be downloaded. When the system finishes sending the file to you, you will see the access prompt again.

We hope our readers will be able to obtain Spread from one of these outlets. Let us know of any difficulty you might have using these systems. If this experiment in telecomputing is successful, we will try again soon. ◀



# MAIL 100



*Editor's Note: In addition to letters from our readers, we also include in Mail 100 letters from CompuServe and The Source. Those message writers are identified by their CompuServe (CIS ID) and Source (STC ID) identification numbers.*

## ERROR IN ROM

Everyone at Polar Engineering and Consulting appreciated Carl Oppedahl's review of our Option ROM, *Portable 100*, September 1984, page 56. In "Accessing the Option ROM" sidebar, however, there's an error as to how CALL 911 accesses the Option ROM.

The code sequence in Tandy's ROM starting at address 911 is:

911: MVIA,1  
913: OUT E8H  
915: RST 0

The problem with Oppedahl's description is the RST 0 instruction at 915 is never executed. The Option ROM is enabled by the OUT E8H instruction, thus when the CPU reads the next in-

struction it comes from the Option ROM, not Tandy's ROM. The Option ROM boot code starts at Option ROM address 915, not address 00H as Oppedahl suggests.

Hopefully this correction will help your readers better understand ROM bank switching.

Thomas C. Bennett  
Director  
Polar Engineering and Consulting

## VENDOR CHALLENGES REVIEW

It has come to our attention that Peter Stanwyck has written a review of our product Text Power 100 which your magazine is publishing this issue.

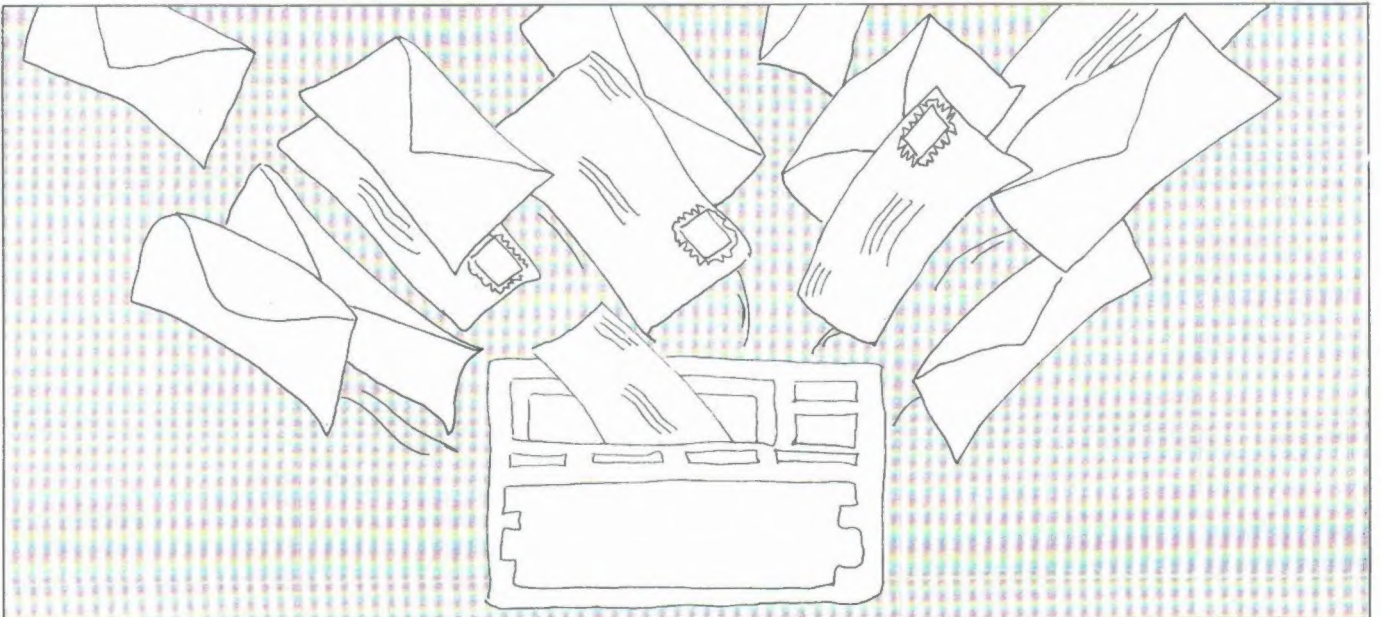
I must warn you we've not sought to have this product reviewed by your magazine. Nor have we extended a license to Stanwyck to use or possess Text Power 100. Each copy states "For use by license only." Stanwyck was read and acknowledged a Notice of Revocation of License statement some months ago which clearly denies him permission to purchase, possess, or use Text Power 100.

Fair comment and criticism is your right. However, wreckless disregard of the truth and malice are two areas in which you may face exposure if you aren't careful. Also, I don't think at this time that I qualify as a public figure with regard to statements about me personally or professionally.

It's your responsibility to verify the accuracy of everything stated as fact in the article and to ensure fair comment and criticism doesn't fall towards malice. Fact errors, distortions (by omission or otherwise), innuendos of a negative and damaging nature; and statements tending toward ridicule or contempt won't be forgiven.

You've assured me that all proper precautions will be exercised. This letter is to detail for you the standards we expect to be met. I only write this letter because 16 years of journalism experience tells me these things need to be said. The strong tone is vital; please don't take it personally, but do take it seriously.

Bob Covington  
The Covington Group  
New York, NY





When DATAPORT/CS introduced the first micro-size letter-quality computer printer, it was such a big hit even we wondered what we'd do for an encore.

Now we know.

And we are happy to present the enhanced version of this revolutionary letter-quality computer printer that we used to write the product announcement you're reading. The DataPort LQ retains the title of the lowest priced letter-quality printer in the world!

You'll be happy to know the price remains a solid \$295.00.

Like the original printer, the DataPort LQ is still 8-1/2 by 11 inches in size and only two inches thick. As you'd expect, the enhanced model of the LQ is still made with industrial quality components. We give you a one-year unlimited warranty on every component inside the printer. The computer interface is Standard Parallel and Centronics Compatible. Maximum column width is 80 characters per line and printing speed is 15 characters-per-second. The printer uses standard 8-1/2 inch plain paper by any length.

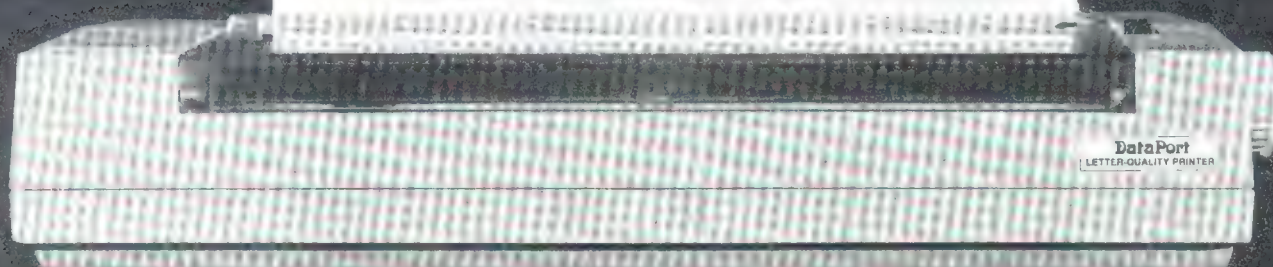
The DataPort LQ letter-quality printer is built with the same degree of performance and reliability found in much more expensive models. Printing is bidirectional, and the ASCII 96-character set is well suited for most personal or business needs. It can underline or BOLDFACE with ease — and "understands" all other control codes sent from your computer. All this for just \$295.00.

There's even more to our encore. Now you can write in a taxi, correct it in a coffee shop, and print it on a plane. Here's the rest of the DATAPORT/CS collection for your consideration.

The DataPort DM is a full featured dot matrix battery-powered or 110 volt AC printer that can printout both bidirectionally and unidirectionally, on ordinary paper, and still fit into your briefcase, leaving room for your notebook-size computer. The DataPort DM can print out a full 80 column page of text, almost without a sound. The high quality printer head not only prints on ordinary paper with its ribbon cassette but it can print on thermal paper as well. The DataPort DM is notebook-size and zips through your text at 30 characters per second. The DataPort DM supports a Standard Parallel Centronics interface and is available for \$225.00.

The DataPort MQ is a 40 column micro-size dot matrix printer with selectable column widths, upper and lower case characters and true bit mapping graphics capability. It can be battery powered and is supplied with a 110 volt AC adapter. The DataPort MQ is truly pocket size—approximately 4 inches square—and of course, the interface is Standard Centronics Parallel. The DataPort MQ uses plain paper and a standard ribbon and is offered at \$155.00.

DATAPORT/CS is the wholly-owned subsidiary of Central Stationers, Inc., founded thirty-four years ago in the San Francisco bay area. We invite you to call 415/ 233-2530 for ordering information, or write: DATAPORT/CS, 169 South First Street, Richmond, CA 94804 for a data packet on the products mentioned here. Shipping and insurance on all orders is an additional \$10.00 to any city in the United States.



(415) 233-2530



## DATAMASTER DEMUSTERED

What a ripoff! I'd responded to one of your advertisers regarding a so-called inexpensive spreadsheet requesting additional information. Upon receipt of the same, I promptly sent a cashier's check (last June) along with my request for this program. After more than six weeks of waiting, I sent a follow up note on August 6 ... no reply.

In October, at my expense, I made a

long distance call to their answering service, only to find this character hasn't checked with them since August for his messages.

I know you're a reputable firm and wouldn't want your other unsuspecting, gullible readers to be taken as I have been. Can you suggest what recourse I have? Or do I mark this one up as classic stupidity?

Robert M. Maeda  
Honolulu, HI

► We recently have received other complaints from readers who have responded to Datamasters' ad. With the first letter received, we wrote to this company, asking for an explanation. A response from them has never been received; hence, we have no knowledge concerning this vendor's status.

—Eds.

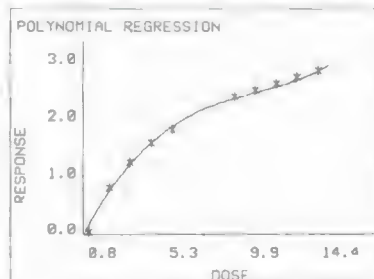
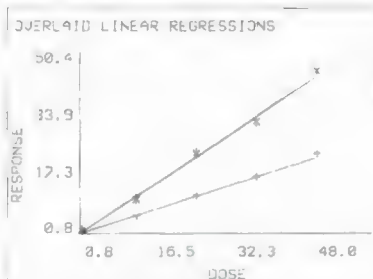
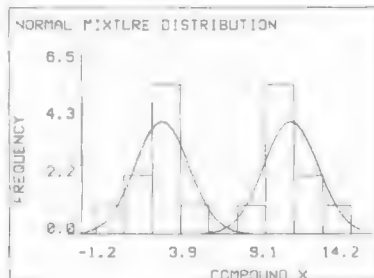
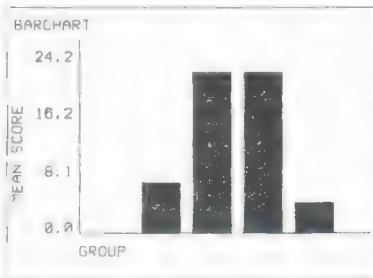
# The Portable Statistician

Software package to make your Radio Shack Model 100 and CGP115 color plotter into a portable statistics/graphics workstation.

## Features:

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## SPEND A LITTLE, GET A LOT

Your magazine recently convinced me to dig into my limited savings and make four purchases.

My first was the fine 32K RAM chip. It's exactly as described in the ad and far better than I anticipated. It provides real *live* RAM for anything you can put in it, even machine-language programs at the same addresses as the machine's bank. I weighed this factor carefully when choosing it over mass-storage devices available.

My next purchase was the Dataport printer. I'm pleased with this purchase, too. It has professional print quality. Not knowing the 100 doesn't give a code 10 line feed, I saw that it required a better formatting program than I was using.

Because of my lack of knowledge concerning other printers available besides my Radio Shack, I didn't know the right questions to ask when buying formatting programs. I decided to purchase Text Power and Text Journalist. Both are really good programs.

Also, *Portable 100* is a must for Model 100 owners.

Mark D. Macy  
Nazareth, PA

## BAR CODE READER MODIFIED

Having read the review of the Radio Shack Bar Code reader in the August issue, page 70, I'd like to point out that the product is good, but the manual is lacking.

Page 10 in the manual notes if you need only one of the machine-language decoders, you can avoid the need to tie up memory by not SAVEMing the decoder, and refers to Appendix D for details. I found Appendix D uninformative so offer the following:



Using B3OF9 as the machine-language decoder and the Example 1 Basic program on page 11 as examples, you can modify the Basic program by replacing line 20 with 20 CALL 61824.

With this program stored in memory, type CLEAR 100,61788 and CLOADM"B3OF9 as mentioned on page 9 to load the decoder to the execute area of memory.

Now you can load and run your Basic program. It'll run the decoder by calling it from its execute address of 61824.

When you're done with bar-code reading, you can dump the decoder from the execute memory area and reclaim all your memory by typing CLEAR 256,MAXRAM as well as CLOSE and CALL 61807 (pages 12 and 13, line 130).

Terry Griner  
Spokane, WA

#### STICKING WITH PORTABLES

I just want to commend you for deciding not to include computers such as the Tandy 2000 in *Portable 100*.

I used to subscribe to both your magazine and *PCM*, but have decided to only renew my subscription with you ... the one that's 100 percent portable computer oriented.

Now that you're going to include bar-code listings, I'll have it all.

William S. Auman  
Bella Vista, CA

#### GOODMAN ARTICLE UPDATE

I presume the lag between writing an article and publishing it accounts for Danny Goodman's report of the need to use a separate program to make a document uploaded from the 100 to the Mac readable by MacWrite. (See *Portable 100*, September 1984, page 42.) Version 1.87 of MacTep accomplishes the same thing when the Option R command is entered again at the end of a transmission.

Also, there's no need for a modem for the Mac to get the MacTep program from CompuServe. I took it off the 100 end and then uploaded it to the Mac using an earlier shorter version of

MacTep I'd typed in from a listing in A+ magazine. I'm assuming the "brute force" program referred to in the article could be used in the same way.

Thanks for the pinout diagram. It's not available elsewhere. I lucked out and got it right the first time interpolating from descriptions in Cary Lu's Macintosh book. It cost \$26 from a local electronics store. It should be pointed out that it's a null-modem cable and won't work with a modem. I'm surprised the printer cable works.

I thought of that but assumed it would need a null modem.

I find that short programs and documents (about 2K) can be sent to the Mac at 9600 baud but longer ones will overflow its memory at rates above 2400 baud. Going the other way, the 100 does just fine at its maximum rate with documents up to 16K.

Donald M. Scanlon, M.D.  
Carmel, CA

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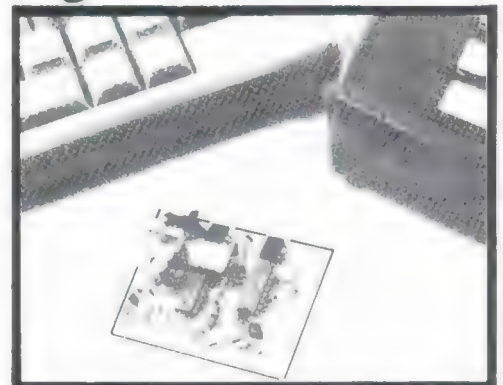
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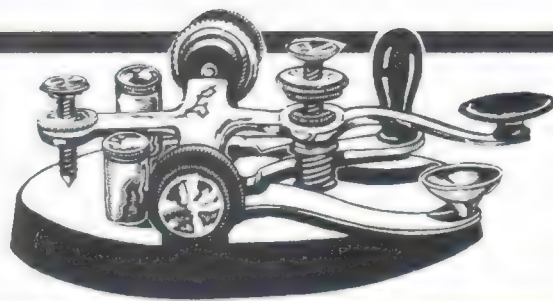
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# THE WIRE



## FCC ACTION ON PICO "NOISE" UNLIKELY

The flap over portable computers possibly jeopardizing the safety of commercial airline flights won't induce the Federal Communications Commission to make sweeping changes in its rules on "noise" emissions by computers.

The FCC's position was outlined at a meeting of Special Committee 156, a group created by the Radio Technical Commission for Aeronautics, an airlines industry advisory board, to investigate possible safety hazards caused by using portable electronic devices, including computers, in aircraft.

According to the minutes of SC 156's meeting held September 18-19, D. R. Yates, an FCC representative, "stated that unless there is additional evidence of interference, he does not feel that there is any justification to go out with rule making that would tighten limits on all devices across the board on the possibility they would be used on an aircraft.

"As a general rule the FCC rules do not cover safety for aircraft; however, they are concerned about approving any equipment with an FCC label that can cause a problem."

Yates added if tests clearly showed emissions from devices regulated by the FCC were unsafe when used in aircraft, the agency would possibly take a closer look at the problem.

To date, Yates said, no one has formally asked the FCC to take a second look at its emissions benchmarks.

Yates's presentation was a response to a memorandum submitted to committee members by chairman Frank White. That document proposed a course of action for the group, which has been studying the interference problem for more than a year. Actions proposed by White included changing FCC regulations (see *Portable 100*, October 1984, page 10).

Yates indicated, however, FCC action would be extremely slow. Asked by one committee member what the chances were of toughening FCC standards for emissions causing problems in any aircraft frequency band, Yates said not too probable.

However, he added, if a justification is provided that a safety factor is involved, the commission may consider it, circulate it for comment, and make a ruling. This process, he said, may take up to two years.

Another action proposed by White called for prohibiting using portable computers during an aircraft's takeoff and landing. This provision would be difficult to enforce, a representative of the Air Transport Association told committee members.

Members were also told of an incident on a United Airlines B-727 over southeast Colorado. When the pilot found the needles on some of his navigational instruments wandering, he sent his first officer to check the passengers. The officer discovered a passenger listening to a "ghetto blaster." After the radio-recorder was turned off, the plane's naviga-

tion equipment corrected itself.

The committee reviewed several documents at the meeting including one on passenger dissatisfaction with airline policy on portable devices and another on an Air Canada charter aircraft with press personnel and a variety of portable devices making multiple flights across Canada without experiencing any interference problems.

The next committee meeting is scheduled for January 23-24, 9:30 a.m., Radio Technical Commission headquarters, 1425 K. St., NW, Washington, D.C. ◀

## MODEL 100 IN SPACE

The Canadian government used a Model 100 to conduct experiments aboard the U.S. space shuttle *Challenger* during its space mission in October.

The 100 was used in experiments to measure the atmosphere, according to Estelle Dorais, a spokeswoman for the National Research Council of Canada, the agency operating Canada's astronaut program.

"We chose the Model 100 because it's so portable and operates on four standard AA batteries. It's also easy to communicate with the Model 100 through its RS232 port," said Dr. Wayne Evans, principal investigator of the sunphotometer earth measurements project. Evans is a scientist at the Atmospheric Environment Service of Environment Canada.

The 100 was approved for the shuttle flight by the U.S. National Aeronautics and Space Administration after expensive tests. Qualifying tests determined electromagnetic and toxic gas emissions from the computer fell within NASA specifications.

The 100 is only the second personal computer approved by NASA for use on the space shuttle, Evans said.

The computer is being used by Marc Garneau, the first Canadian astronaut, along with a sunphotometer to measure solar radiation.

The first part of the measurements consisted of calibrating the sunphotometer by pointing it directly at the sun from space. This procedure could not be done directly from earth because the effects of the earth's atmosphere would skew the reading.

Pointing the sunphotometer at the sun at sunrise and sunset, the instrument allows the Canadian astronaut to measure the density and distribution of the volcanic haze from El Chicon, a Mexican volcano that erupted March 26, 1982.

Results of this experiment will be used to determine the density and distribution of the El Chicon haze before the haze has disappeared.

The experiment will also investigate the distribution of water vapor and other atmospheric gases which affect the chemistry of the ozone layer. ◀



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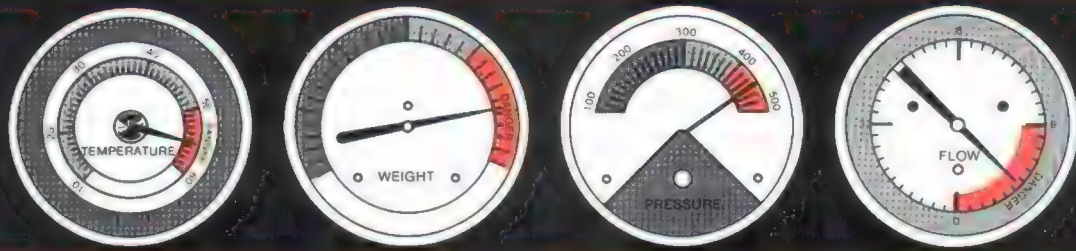
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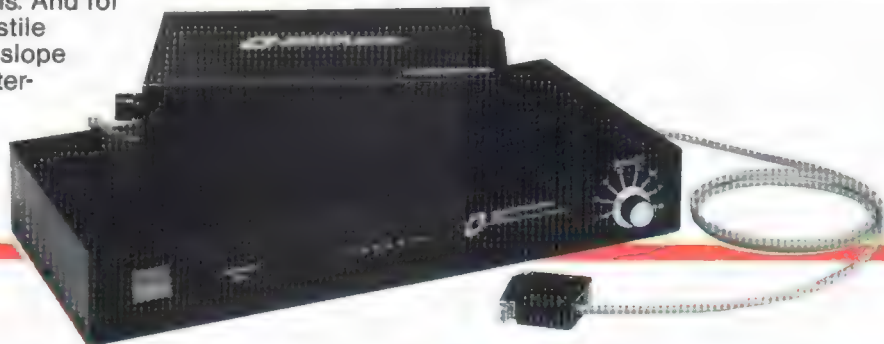
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# NEW PRODUCTS

EDITED BY NANCY LAITE



It looks like the Model 100 can play ball with the big boys. Whether *real* 100 users eat quiche or not, there's new software slated to bring *real* word processing to the 100.

About **LAPSTAR**, author Randy More told *Portable 100*, "To my knowledge, no one has come up with a true word processor for the 100 before this." ... And we know he's right. The biggie with Lapstar is its ability to display 55 percent more viewable text, 60 columns by 10 lines, on the standard 100 screen.

The trick was to use a 4 by 6 matrix, smaller than the 100's 6 by 8. That change made the reduction possible.

Less than 4K including the character table, Lapstar is in machine language using the almost universal Wordstar commands. No more clumsy Basic commands, it allows full cursor control and your choice of either line wrap or text window style displays. Users can define, copy, move, and delete blocks of text. You can create, delete, and edit right from Lapstar.

Lapstar sells for \$74.95 and is distributed by **CISS** of St. Louis, MO. Readers can also contact Randy More on CompuServe, CIS ID 74106,635.

While Epson's **PX-8 GENEVA** lap computer has been drawing laudable reviews for its expansion units, a Model 100 vendor doesn't plan to be left behind. We've learned a similar device is being constructed for the MEWS housing 16 slots for users to plug in ROM-based software or additional chips.

Meanwhile, **RADIO SHACK** is promising two belated Christmas gifts by late January. Their 32K ROM, **MULTIPLAN**, will have a subset featuring close to 95 percent of its big brother's functions. Market price is set at \$149.75.

Also from Tandyland, Radio Shack reports a new bar code will be out. Developed to do error checking especially when reading long bar codes, **TANDY**

**CODE** is for eliminating the step of transferring programs to disk or cassette. Dig deep though, Tandy Code will be selling for \$2495.

The New Year also promises to bring a new information network. An inside source at the project says the system will concentrate on interactive services like CB simulation and special interest groups. The service plans to offer premiums — such as day-time use and 1200 baud access — as part of the basic structure.

But if posting correspondence for European destinations is more of your concern, then **LINQ SERVICES'S** hard-mail interface may be what you're looking for.

**RODERICK MANHATTEN AND ASSOCIATES**, a communications subsidiary of an international marketing company, have introduced this facility for users of electronic message systems and electronic data bases. Linq is currently on **THE SOURCE** and **ITT DIAL-COM** and has plans to include other major networks.

**SOUNDSIGHT** of Hollywood, CA, appears to have a winner: **BUBBLE MEMORY**. "It's great," says one happy purchaser.

That buyer is Sy Miller, vice president of **REGAL**, a division of **POLYPAK INDUSTRIES INC.**, manufacturers of plastic bags. Sy has two 256K units and says they're just what the doctor ordered for his sales force.

"Right now, it's just a big disk drive," Sy explained, because the Bubble can only be used for storage.

But that's destined to change soon, according to Soundsight. By this printing, it expects to have software for the Bubble that'll enable the 100 to look at the additional memory as if it were part of the 100's RAM.

"I told them they should be selling stock," Miller said about Soundsight, "because they're going to make a million bucks!"

For readers with **NEC** ties, **PURPLE COMPUTING COMPANY** of Camarillo, CA, has just released a memory expander in cartridge form. Designed as an alternative to NEC's 32K cartridge, **SIDECAR** is expandable to 128K, using the same plug-in slot.

"It's the greatest thing since apple pie," boasts Purple Computer owner Larry Berg. "With the capability of a disk drive, speedy memory, and convenience of portability [the SideCar] is unique," and actually becomes one with the 100.

Another hot item from Purple Computing is a spreadsheet manufactured by a major Japanese company. "We're the only company importing **PSCALC**, the only ROM software available for the NEC," reports Berg.

Berg offered some other industry gossip that NEC owners may be interested to know. Although the 100 has quite a loyal following over there, apparently the Japanese aren't as crazy about the NEC as we Americans are. Hence, they looked to the States to market the SideCar.

Talks with the Japanese must be going well because Berg also says a Japanese company has expressed an interest in marketing Purple Computing's memory modules. We'll let you know if that goes through.

And finally, a solution for brownout ... blackout ... by whatever name, if it happens to you while using AC power you're up the creek. **SUN RESEARCH INC.** in Durham, NH, is marketing a solution especially for the 100 or lap-size computer user who transfers files to a desktop.

The **Sr3** or **Sr30** offer uninterrupted power supply. Although not the type of peripheral you'd lug around, when used for real-time operations, the time and money saved if an outage occurs is priceless.

For \$595 and \$995 respectively, both the SR3 and SR 30 are compatible with the 100. ◀



# BUSCH LEAGUE

DAVID BUSCH



## AUTO PROGRAM — PART 8 PURGE YOUR 100 LIKE THE BIG BOYS DO

*Editor's Note: This is the eighth in a series of columns by Dave showing Portable 100 readers how to program the Model 100 to program itself. The columns are adapted from Dave's book Teach Your TRS-80 to Program Itself, published by Tab Books Inc.*

**T**his month we're going to look at one difference between the TRS-80 Model 100 and other popular business-oriented computers — the lack of an operating system. Along the way, we'll investigate creating our own equivalent of DOS commands, using Basic. Our example will be File Purger, which gives you a prompted file deletion capability.

If you don't have a video interface for your MEWS, you probably don't use disks with your portable. And, unless you use another computer system, you might not be familiar with operating systems in general. Some computers power up directly into Basic — the Commodore 64 and VIC-20, for example, or even the Apple II and IBM PC if you don't have a disk attached or available. The TRS-80 Model I/III will start up with Basic only, if you hold down the break key while resetting.

However, most computer systems today consider Basic to be just another disk-based program that you can load and run. When you turn them on, a disk with the operating system has to be in place. The operating system controls many things, ranging from how to store and retrieve data from unintelligent disk drives, to file management and utilities. The nice thing about

operating systems is they can be very powerful, and include commands that take a lot of the work out of using your computer. The bad thing about an operating system, is many of them are difficult to learn and use (like UNIX) or so unfriendly (like CP/M's STAT or PIP commands) that new users are confused and even experienced users make frequent mistakes.

**SYSTEM IN A SHELL.** One solution has been to construct an operating system *shell* that insulates the user from the need to learn commands. A shell often uses menus and other tools to lead the

operator hand-in-hand through procedures. This can be useful, particularly if the veteran user also has the option of typing commands.

The Model 100 has a limited type of shell-operating system. If you turn the power off while running an application, the MEWS will still be in that mode the next time you turn the computer on. Otherwise, you'll see the familiar menu screen. You may select an application or file from the menu (or type in its name). The Model 100's shell is sophisticated enough to know that .DO files require Text, and .BA files need Basic. However, that's all you can do from the shell. You can't kill a file, name a file, or do any of the dozens of things that other operating systems allow.

Basic, like most versions of the interpreter, has some commands that allow doing some of these things. For many of us Model 100 users, Basic is the closest thing we have to an operating system. That's why, if you're a devotee of *The Automatic TRS-80*, you'll want to write at least some of your own operating system commands in Basic.

**POWER PURGE.** To be sure, it's possible to add these commands with machine-language routines. There are several utilities available to delete or make "invisible" menu entries. However, we'll leave the really difficult stuff to Jake Commander. If you're interested in learning how to create your own operating-system-like commands in Basic, read on. Our first example is File Purger.

Those who came to the TRS-80 Model 100 from either the Model I or III may be familiar with NEWDOS 80 and other operating systems with a purge command. Instead of tediously KILLING (or ERASing or REMOVing) one file at a time, purge shows you each file name in turn, and allows you to enter Y (Yes, kill this file), N (No, don't kill that one) or Q (Quit this application.)





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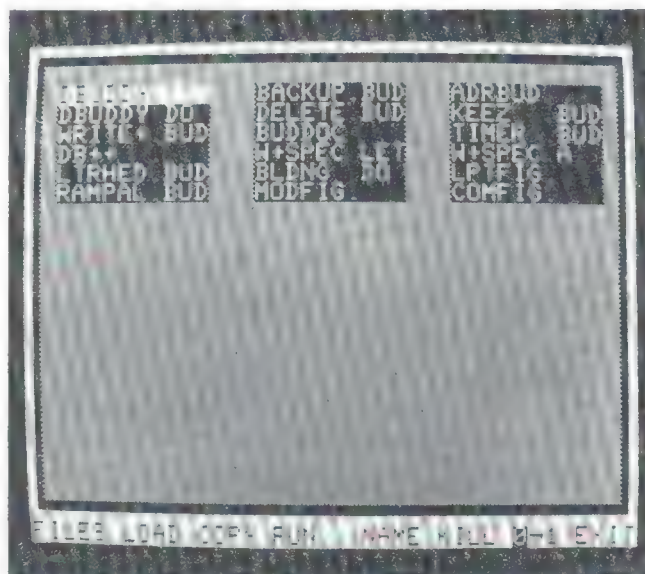
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*A typical Disk-Buddy Menu.  
Note the function key labels on the command line.*

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DISK-BUDDY works great with programs that use "spec" files and templates. Just keep your favorite models stored on disk. A key touch loads and saves it to RAM, another touch gets you into your application. Changing formats is just as simple: load the new template with a single keystroke.

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For TRS-80 Model 100, 24K RAM, DISK/VIDEO INTERFACE, WITH MONITOR, TV, OR LCD.



File Purger brings this potential for disaster to the Model 100 in a deceptively simple program. Those of you who love to poke around in memory will probably be able to derive several improvements; we'll provide hints later on. However, the version listed here is simple enough for adults to understand with ease.

**STORAGE ARRAY.** The program begins by setting aside 22 slots in a string array, N\$(22). This array will store the file names of each of the files on your menu. Of course, there are only 19 empty positions, normally, but we've left extra space in case you've managed to use one of those utilities that make the ROM applications invisible. If you prefer to type in Basic or Text rather than slide the menu cursor over, that's your business.

The screen is cleared, and the files command lists all the non-ROM files to the screen. A for-next loop begins at line 100, which will, if necessary, count off from 1 to 320—one for each screen position. The following line stores in variable T\$ the character found in that screen position, via a handy peek of the correct RAM locations. If you've been reading *Portable 100* for more than one month, you already know where these locations are.

Next, in line 120, the program looks to see if T\$ is a space or an asterisk. Files prints out all six character positions allowed to the left of the period, even if they aren't used. Extra spaces are added if a root filename is less than six characters long. Line 120 ignores them. It also ignores asterisks, which will be appended to the filename of the program currently in memory.

**KILL SAFETY.** In line 150, we count up the number of null characters looked at since the latest filename was started. If this counter, NC, is greater than 10 (meaning we've looked at so many spaces that it is safe to conclude that we're at the end of the file listings), the program breaks out of the for-next loop. That way, we don't have to peek at a lot of blank screen—just the file names.

Until that point, however, T\$ is added to the current filename being constructed. Whenever the third-from-the-last character is a period (line 140), the program knows that the end of a file name has been reached, since Model 100 files always have a two-char-

acter extension. Then, another counter, CU, is incremented to start the next filename, and NC is returned to zero.

By this means, all of the filenames are read and stored in N\$(n). Purging starts at line 180. A for-next loop from 1 to CU-1 (the last filename is 10 nulls, remember) displays each filename in turn, and asks for a Y/N/Q response. For safety's sake, you *must* enter either an uppercase or lowercase Y in order to purge a file. A Q will end the program, and anything else will be considered a no answer. One must be extremely careless to lose a file with this program. For that reason, I isolated line 230 (which does the killing) with a REMark

during program development.

**PEEK FOR A POKE.** Once all the files (that you want) are purged, the program displays your new files, much to the user's satisfaction, chagrin, or dismay.

By now Jake Commander's fan club is probably up in arms. Why not simply peek those directory memory addresses storing the file names, and then poke them into oblivion? I have an answer to that. The two of us have agreed not to tread on each other's territory. I have stopped playing my Fender Precision Bass in public, and never, ever use pokes if I can help it. Jake has agreed, in turn, to stop making stupid remarks. ◀

```

10 ' *****
20 ' *
30 ' * File Purger *
40 ' *
50 ' *****
60 CLEAR 1000
70 DIM N$(22)
80 CLS
   : CU=1
90 FILES
100 FOR N=1 TO 320
110 T$=CHR$(PEEK(N+65023))
120 IF T$=CHR$(32) OR T$=CHR$(42)
   THEN T$=""
130 N$(CU)=N$(CU)+T$
140 IF LEFT$(RIGHT$(N$(CU),3),1)=
   CHR$(46) THEN CU=CU+1
   : NC=0
150 IF T$="" THEN NC=NC+1
160 IF NC>10GOTO 180
170 NEXT N
180 CLS
190 FOR N=1 TO CU-1
200 PRINT @162,N$(N);TAB(15)"<== KILL
   IT? (Y/N/Q)"
210 A$=INKEY$
   : IF A$=""GOTO 210
220 IF A$="Y" OR A$="y"GOTO 230
   ELSE GOTO 240
230 KILL N$(N)
240 IF A$="Q" OR A$="q"GOTO 260
250 NEXT N
260 CLS
270 FILES

```



# Introducing **SUPERA** and **TEX PRO**...

## More Revolutionary Software from Micro Demon

### **SUPERA - Beyond PRO AID**

SUPERA is a revolutionary concept in Model 100 software. Like PRO AID, SUPERA adds many new features to the Model 100 operating system, making your computer far more powerful. Unlike PRO AID, or any other machine language program, SUPERA loads and behaves like a BASIC program! Because of its unique format, you will not have to worry about memory conflicts between SUPERA and other machine language programs.

Essentially, SUPERA gives you all the features of TEX PRO and almost all those of PRO AID, and more, in a remarkably easy to use format. While in use, SUPERA must remain in the computer as a Basic file, and it must be the first Basic program loaded from cassette. But otherwise you can forget about it. SUPERA will constantly work in the background providing your Model 100 with numerous features otherwise not available. In addition to the TEXT and BASIC enhancements provided by PRO AID and TEX PRO, SUPERA also allows you to kill and rename files by control keys while at the main menu. Only a few of the lesser used features of PRO AID are missing from SUPERA. Registered PRO AID owners can purchase SUPERA at a reduced rate.

### **TEX PRO - Give Your Model 100 a Real TEXT Editor**

TEX PRO enhances the text editing capabilities of the Model 100 in much the same way that TEL PRO enhances TELCOM. When you enter TEXT after running TEX PRO, you will discover that TEXT suddenly has several new features.

- \* You can turn on a 'type over mode' in which typed characters will replace the current text instead of being inserted.
- \* The F4 key will activate a powerful, multi-featured search and replace function.
- \* You can change the case of the character under the cursor by a control key.
- \* You can delete a word or line by pressing the appropriate control keys.
- \* The same 26-function key capability as PRO AID except that the keys can define longer strings (up to 28 characters)
- \* And More!

TEX PRO is an intelligent program that will turn itself off as soon as you exit the Model 100 TEXT mode, and thus will avoid conflicting with other machine language programs you may be using.

### **ASM - A Powerful 8085 Assembler**

Only 3.6K bytes long, ASM is both compact and fast. In fact ASM can assemble a 14K source file version of itself in about 20 seconds. Input and output data can be either decimal or hex. Constants can be in either decimal, hex or binary. Output is automatically routed to the printer if the printer is connected and on.

ASM supports +, -, \*, /, exponents, MOD, AND, OR, NOT, and the use of parenthesis in the data field.

While not a macro assembler, ASM contains a built-in library of useful macros which you can immediately add to your programs. Among these are a collection of relative branch instructions that make it possible to write relocateable routines for use with a BASIC program.

ASM checks for most common errors, and if one is detected, it displays the offending line with the error in inverse video.

As an end of assembly option, ASM will provide a table of addresses for all symbolic labels. This table includes the number of references to each label. ASM comes with full documentation, and a listing of useful ROM routines.

### **TEL PRO - A Telcom Enhancement**

TEL PRO adds a whole new dimension to the TELCOM program. If you enter TELCOM via TEL PRO, you will discover a variety of new capabilities open to you. Without losing your connection, you can kill files, access the menu, check the time, perform BASIC calculations, upload BASIC programs, set alarms, access help screens, append data from the display to text files, read text files, and more.

### **PRO AID - Background Power**

PRO AID is a machine language program that adds many powerful features to your Model 100. You get 26 new, easy to define, super function keys that can be used in TEXT and TELCOM as well as BASIC. You also get automatic line numbers, instantaneous deletion of any range of BASIC lines, a special calculator mode with new BASIC commands, immediate access to MENU programs, a program status key, and much more. PRO AID uses less than 1.8K of your memory, and can be located anywhere there is room. PRO AID comes with complete documentation.

### **DASM - Far Beyond a Mere Disassembler**

DASM is for the serious ROM investigator. DASM does much more than simply disassemble the machine code inside your Model 100. It provides function key controls to easily follow the logical flow of the code, to access the contents of specific locations, to check the keywords corresponding to BASIC tokens, and more. DASM allows for input/output to be in either hex or decimal. You can interrogate any range of memory, and then return to the disassembly.

DASM also contains a remarkable split-screen effect that makes it possible to view the previous 8 lines of the disassembly.

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# FULL-DUPLEX

TERRY KEPNER



*Editor's Note: Full-Duplex is dedicated to solving reader's Model 100 problems. Readers needing assistance should address their letters to Terry Kepner, P.O. Box 481, Peterborough, NH 03548. Readers are reminded to include a return address with all Full-Duplex correspondence.*

## COMPUTER NOT PRINTER ERROR

I was pleasantly surprised to see Traveling Software mentioned in the July issue. However, I must report the Traveling Communicator has been discontinued due to a lack of demand. The products we are currently shipping are the Traveling Appointment Manager, Expense Manager, Project Manager, Sales Manager, Time Manager, Traveling Writer (T-Writer), and T-Base (the Traveling Data-Base Manager).

I also read with interest the letter regarding the margin problem the reader was having with his ProWriter. We have had two customers experience similar problems with our software. I have been unable to duplicate the problem on any of our equipment, but one customer moved our software to another Model 100 and, using the same Epson printer, it worked. This leads me to believe it was the fault of the computer and not the printer.

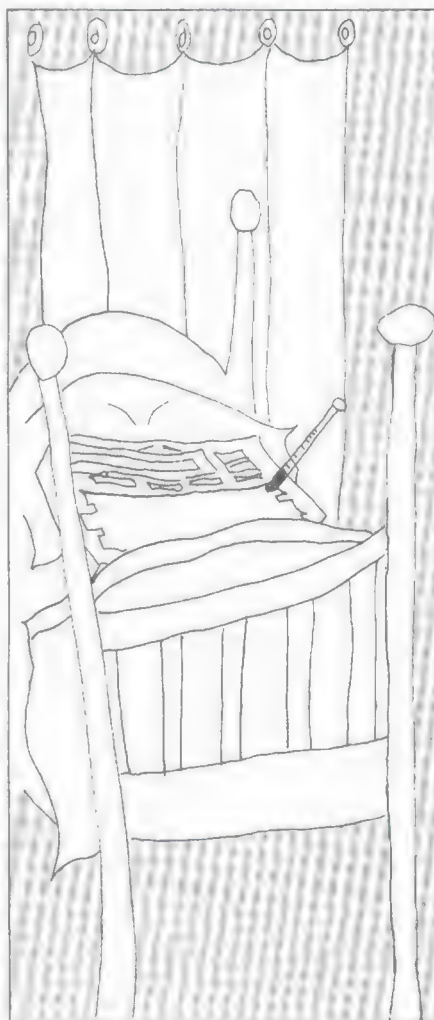
One other point — our program uses TAB, not SPACE\$.

Neil Smith  
Product Support  
Traveling Software Inc.  
Seattle, WA

► Thanks for writing.

plex referring to the Chinese character-generator board.

I've been searching for such a capability for the Model 100, but more specifically for an IBM PC. My need is for Korean, Chinese, and Japanese characters. Would you tell me specifically what it is I am looking for (that is, what



I should ask for?) and where I might find it?

Tony Schumacher  
Madison, WI

► The device mentioned in that letter is an RS232-driven black box. To use it you send ASCII data and it converts the letter codes to corresponding Chinese characters.

I don't have any information on who makes the unit or where you can get it, but you can write to Caroline Chine, 393 West Broadway, NY, NY, 10012, and she might be able to steer you in the right direction. Good luck.

## NEWS CONNECTION

The easiest way to transfer Basic programs or text files from one 100 to another doesn't seem to be documented anywhere (except indirectly by Mark Earle's letter in your April issue), yet my friends and I have used it with complete success for months.

First, with both 100s connected through the modem cable, make phone-voice contact. Be sure the receiving computer has sufficient free memory and that one modem is set to originate and the other to answer.

When sending a Basic program the sender goes into Basic and loads the program to be sent, then types F3 followed by this sequence: MDM:711E. The receiver is also in Basic and he types F2 followed by the same MDM:711E sequence. The receiver hits the enter key first; then the sender presses enter. Nothing will appear on the screen until the "ok" prompt appears at the end of the save, at which time the voice link can be reestablished (one of the big advantages of this method).

Text files can be sent in the same way. Load the document to be sent and transmit it by pressing the F3 key, then type the same MDM:711E sequence. The one who is receiving the file creates a text document and presses the F2 key followed by MDM:711E and hits enter first. And when you're through

## CHARACTER REFERENCE

I was delighted to read the letter in *Portable 100's* June issue in Full Du-



transmitting you can go back to your conversation!

Rick Mendosa  
Santa Barbara, CA

► Sometimes the most obvious solution is the last to be discovered.

#### MODEL I AS TERMINAL

**E**arly this year my son gave me his TRS-80 Model I Level II computer to which I added a DMP-100 printer, an LNW expansion interface, and a Radio Shack Modem I, all of which work just fine.

In May I bought a Model 100 that is perfect for my work as a traveling tech rep. I've tried to hook up the 100 to the Model I as described in your article in the April *Portable 100* and no matter what I do the results are weird! The Model I talks to the 100 accurately; that is, whatever you type on the Model I keyboard shows up on the 100 exactly as typed. It doesn't appear on the

Model I screen, however. (Videotex 26-2220 and the modem-null adapter are used. The status on the 100 must be 3711D,10pps. Any other status and part of the Model I keyboard types blanks.)

Typing on the 100 keyboard causes random letters to appear on the Model I screen (either full or half duplex 100). As long as the 100 is hooked up you get the following: p>>%#JHGSCUJLKG sefl.— and when you type Mary had a little lamb you may get <ary23&5as,, 7alittle59>80amb.

Needless to say, I'm in a quandary because I want to use the Model I as a terminal for the 100.

I checked pin 2 to 3 and everything is fine on both the 100 and the Model I. The Radio Shack Service Center says, "Everything is okay, check LNW"; LNW says, "It's Radio Shack's problem!" They also said that all you need is pin 2,3, and ground.

I clipped all the other wires on my null adapter and it still does it. It is the same effect as when you have been working with CompuServe; you send the bye message and shut off the

modem — the computer prints some random characters on the screen before you shut the computer off.

Jack Bartholomew  
Palos Verdes, CA

► The Model 100 doesn't echo received characters out the RS232 or modem lines, that's why you don't see what you type when you're typing on the Model I. You should switch your Model I software to half duplex, which should echo what you type to your video display. (Don't confuse this with hardware half- or full-duplex operation).

Your other problem is a bit more difficult. From your first paragraph I understand that the Model 100 works fine with CompuServe, and that the Model I transmits correctly to it. Furthermore, the Model I works fine with CompuServe but doesn't receive correctly from the Model 100. Your example using Mary had a little lamb would seem to indicate the baud rate is wrong, except the Model I transmission is not clobbered, so that can't be the problem.

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Also, you can see the received message is longer than what's actually transmitted. This indicates the Model I is picking up characters not sent by the Model 100. I would say somehow your Model I is getting interference from somewhere which is scrambling the message sent by the Model 100.

The first thing to do is to check your LNW expansion interface's RS232 settings, which should be hardwired (and explained in the manual). Change these settings to include parity checking, either odd or even, and change the Model 100 to match, then see if the problem is still around. Try these parameters first: 300 baud, 7-bit words, even parity, one stop bit, and xon-xoff protocol enabled (37E1E). Next try it with xon-xoff disabled.

At the moment that's all I can come up with, but I think the problem most likely is with the LNW interface and the RS232 settings you're using.

#### NEEDS TERMINAL PROGRAM

I use my Model 100 to communicate with an electronic mail program at

my office using my Apple II+ and Hayes Micromodem II as a host system. I frequently develop reports and materials I would like to upload to my Apple host system. Every time I do this, though, I always lose characters, especially at the beginning of each line.

It appears the Model 100 is transmitting too fast or the Apple cannot read uploaded information fast enough. Do you have any suggestions as to how I might approach this problem?

Gordon Blocker, President  
Gordon Blocker Inc.  
Dallas, TX

► It sounds like you're not using a terminal program with the Apple II+. If you're not, then the problem is with Apple Basic: It takes a few moments for it to store received data after a carriage-return arrives (which signals the end of a line). While Basic is moving the data to an appropriate place in memory out of the receive buffer, it ignores any data arriving at the RS232, hence the lost characters at the start of the next line. If the previous line were

short, Basic could sometimes return to the RS232 port fast enough not to lose anything.

The only solution is to use a machine-language terminal program to receive the Model 100 data and store it on disk for later retrieval by your other programs.

#### COLOR COMPUTER TRANSFER

With the following equipment: TRS-80 Color Computer, 32K, two disk drives, TRS-80 Modem I, TRS-80 Line Printer VIII, and TRS-80 Model 100, recorder, cables, and software Colorcom/E, is it possible to transfer data and documents between the two computers? If so, how?

Charles L. Redman, Jr.  
Fairfax, VA

► Yes, quite easily. First you need an RS232 null modem to go between the RS232 ports of the two computers. Plug the RS232 cable from the Color Computer into the null modem, then

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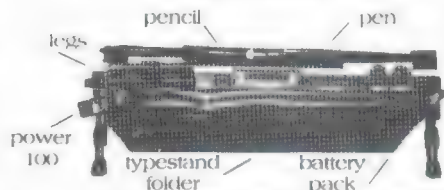
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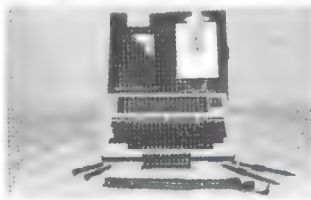


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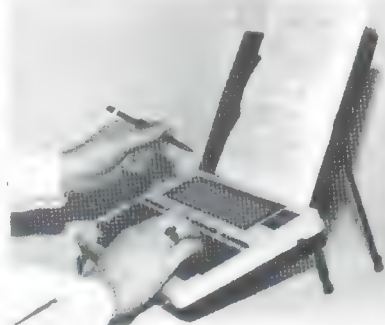


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plug the null modem into the Model 100. Set the RS232 parameters to 37E1E on the Model 100, load Colorcom/E into the Color Computer, and set its parameters to 300 baud, 7-bit words, one stop bit, and even parity. Now start sending data, using Colorcom/E's capture buffer to store and retrieve the information.

that the batteries (presumably the internal nicads) aren't recharged by the AC adapter when it is in use. The Model 100 manual and literature imply the opposite, and if the nicads aren't recharged somehow, where do they get the power to keep data in RAM even when the Model 100 is turned off and not being used? I'd greatly appreciate some clarification on this.

Is there an index of past issues? I'd like to know what nuggets of information I have missed by being a recent convert to the Model 100.

Steven Rosen  
Federal Way, WA

## TO BE SAFE, SAVE TO TAPE

I read with interest reader Fred Forrester's letter to the Full Duplex column and your response in the June issue. I, too, am wondering what to do to keep all my data from disappearing if I go on a two-week vacation and leave my 32K Model 100 at home.

If I leave my AC adapter plugged into the wall, does it somehow draw current into the Model 100 even with the power switch off? Or did you mean that one should leave the power on and the AC adapter plugged in for two weeks or more? Is this safe to do?

I'm also puzzled by the statement

► My information is as long as a power supply is plugged into the Model 100, it is used to power the computer. The on-off switch only controls power to the display and peripheral ports. However, if you're leaving for a long period of time, *don't* leave the power supply connected. There could be a lightning strike nearby or a problem on the

power grid which could fry the brains of your computer.

The internal nicads are charged by the power supply, when it's in use, or by the replaceable AA batteries, as long as they can supply current in excess of that needed to maintain the data in memory. The AA cells aren't charged by the power supply when it's in use.

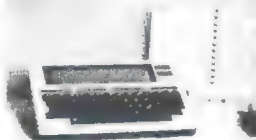
If you intend to leave the computer unattended for weeks at-a-time, replace the AA batteries with new ones before you leave. The trickle of current drawn by the memory is so slight these batteries should last for many months before dropping low enough to trigger the internal nicads into operation. Using the computer dramatically increases the power drain and substantially reduces the lifespan of the batteries.

Just for safety, I would save all my files to tape before leaving. That way, if something did happen and everything was erased, you would still have a backup.

An index to previous issues has been published in the November 1984 issue of *Portable 100*. ◀

# Model 100 / NEC 8201A JOYSTICK

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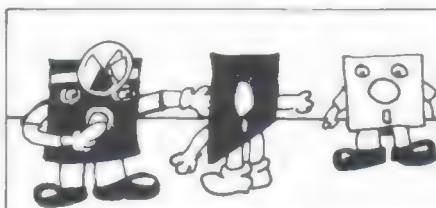


Once you've created a screen full of juicy graphics, convert them to paper.

One of the first things I wanted to do when I got my Epson FX-80 printer was make a printout of the Model 100 screen. Unfortunately, that was out of the question, because the 100 lacked a point command to test the screen pixels.

Don Corbitt was the first to use this method to make a screen-dump program for the 100. For those who are interested, he has an updated version in CompuServe's Model 100 SIG. Being in Basic, it doesn't have the advantages of machine language as this one does, but it's fancier and does make a better printout.

*Important!* If you wish to abort a screen dump, do *not* use break or the



printer will crash (a string of dummy characters should bring it back to normal) or print out some rather strange things. Press the graph key, the code key, and the shift key to abort. Note the normal print key will be unchanged, and will still work as if the screen dump routine never existed.

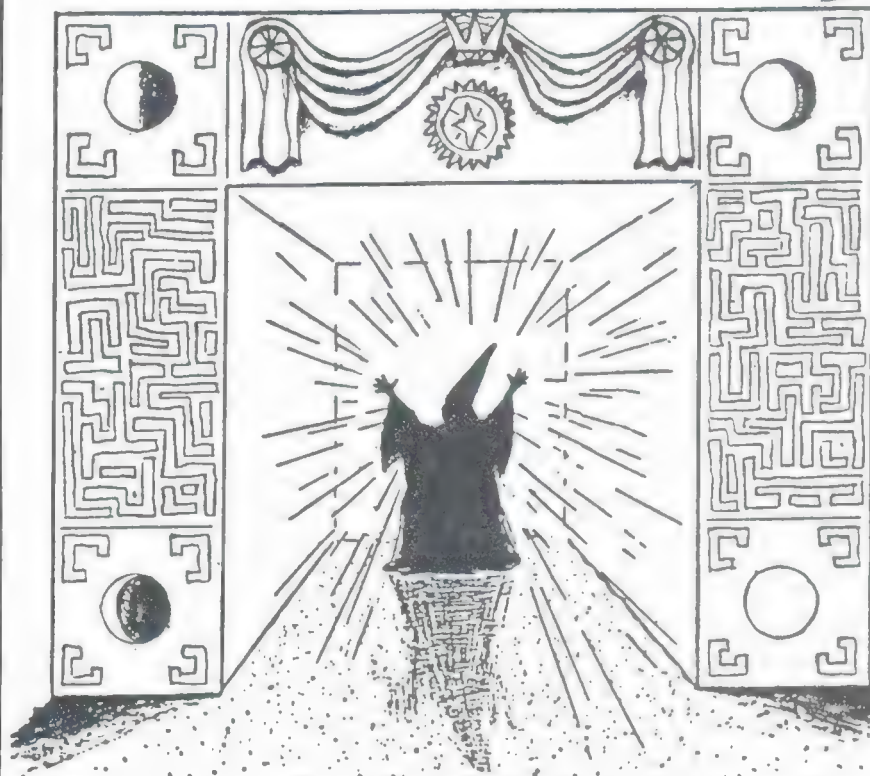
Next the CTRL/SHIFT/GRPH keys are checked. If they're pressed down, the screen-dump routine is called. Then the routine is reenabled and the computer continues on doing whatever it was doing when it was interrupted.

A delay loop is run to give the cursor time to blink once. The bit image is read, and then it's reversed to fit the printer's standard. After the line is finished, a carriage return is sent and the computer tests for CODE/SHIFT/GRPH pressed. If no keys, the next line is started. After the printing is finished, the printer is set to default line spacing and everything else is returned to normal.





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SYSTEM REQUIREMENTS  
MODEL 100 WITH 24K RAM  
DEALER INQUIRIES WELCOME

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Program Listing 1.

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F4C2 00      ORG OF4C2H
F4C3 3AFF5   NOP      ;Holds RET when INIT disabled
F4C4        LDA      OF5FFH ;Old RAM call branch still
        used
F4C6 3203F5  STA      EXIT1
F4C7 2A00F6  LHL      OF600H
F4C8 2200F5  SHLD     EXIT2
F4C9 3EC3    MVI      A,0C3H
F4CA 32FF5F  STA      OF5FFH
F4CB 21E0FA  LXI      HL,START
F4CC 2200F6  SHLD     OF600H
F4CD 3EC9    MVI      A,0C9H ;disable INIT
F4CE 32C2F4  STA      INIT
F4CF 09      RET
F4D0        START
F4D1 00      NOP
F4D2 F5      PUSH     AF
F4D3 05      PUSH     BC
F4D4 05      PUSH     DE
F4D5 05      PUSH     HL
F4D6 3EC9    MVI      A,0C9H ;Disable routine
F4D7 32E0F4  STA      START
F4D8 3EFF    MVI      A,OFFH ;Test for CTRL/SHIFT/GRPH
F4D9 03B1    OUT      OB1H
F4DA 0B2H    IN       OB2H
F4DB 0FEH    ANI      OFEH
F4DC 03B2    OUT      OB2H
F4DD 0E0H    IN       OE0H
F4DE 07H     ANI      07H
F4DF 0C06F5  CZ       SDUMP ;Screen dump if keys pressed
F4E0 AF      XRA      A
F4E1 32E0F4  STA      START
F4E2 03B1    OUT      OB1H
F4E3 0B2H    IN       OB2H
F4E4 0FEH    ANI      OFEH
F4E5 03B2    OUT      OB2H
F4E6 0E0H    IN       OE0H
F4E7 07H     ANI      07H
F4E8 0C06F5  CZ       SDUMP
F4E9 AF      XRA      A
F4EA 32E0F4  STA      START
F4EB 03B1    OUT      OB1H
F4EC 0B2H    IN       OB2H
F4ED 0FEH    ANI      OFEH
F4EE 03B2    OUT      OB2H
F4EF 0E0H    IN       OE0H
F4F0 07H     ANI      07H
F4F1 0C06F5  CZ       SDUMP
F4F2 AF      XRA      A
F4F3 32E0F4  STA      START
F4F4 03B1    OUT      OB1H
F4F5 0B2H    IN       OB2H
F4F6 0FEH    ANI      OFEH
F4F7 03B2    OUT      OB2H
F4F8 0E0H    IN       OE0H
F4F9 07H     ANI      07H
F4FA 0C06F5  CZ       SDUMP
F4FB AF      XRA      A
F4FC 32E0F4  STA      START
F4FD 03B1    OUT      OB1H
F4FE 0B2H    IN       OB2H
F4FF 0FEH    ANI      OFEH
F500 03B2    OUT      OB2H
F501 0E0H    IN       OE0H
F502 07H     ANI      07H
F503 0C06F5  CZ       SDUMP
F504 AF      XRA      A
F505 32E0F4  STA      START
F506 03B1    OUT      OB1H
F507 0B2H    IN       OB2H
F508 0FEH    ANI      OFEH
F509 03B2    OUT      OB2H
F50A 0E0H    IN       OE0H
F50B 07H     ANI      07H
F50C 0C06F5  CZ       SDUMP
F50D AF      XRA      A
F50E 32E0F4  STA      START
F50F 03B1    OUT      OB1H
F510 0B2H    IN       OB2H
F511 0FEH    ANI      OFEH
F512 03B2    OUT      OB2H
F513 0E0H    IN       OE0H
F514 07H     ANI      07H
F515 0C06F5  CZ       SDUMP
F516 AF      XRA      A
F517 32E0F4  STA      START
F518 03B1    OUT      OB1H
F519 0B2H    IN       OB2H
F51A 0FEH    ANI      OFEH
F51B 03B2    OUT      OB2H
F51C 0E0H    IN       OE0H
F51D 07H     ANI      07H
F51E 0C06F5  CZ       SDUMP
F51F AF      XRA      A
F520 32E0F4  STA      START
F521 03B1    OUT      OB1H
F522 0B2H    IN       OB2H
F523 0FEH    ANI      OFEH
F524 03B2    OUT      OB2H
F525 0E0H    IN       OE0H
F526 07H     ANI      07H
F527 0C06F5  CZ       SDUMP
F528 AF      XRA      A
F529 32E0F4  STA      START
F52A 03B1    OUT      OB1H
F52B 0B2H    IN       OB2H
F52C 0FEH    ANI      OFEH
F52D 03B2    OUT      OB2H
F52E 0E0H    IN       OE0H
F52F 07H     ANI      07H
F530 0C06F5  CZ       SDUMP
F531 AF      XRA      A
F532 32E0F4  STA      START
F533 03B1    OUT      OB1H
F534 0B2H    IN       OB2H
F535 0FEH    ANI      OFEH
F536 03B2    OUT      OB2H
F537 0E0H    IN       OE0H
F538 07H     ANI      07H
F539 0C06F5  CZ       SDUMP
F53A AF      XRA      A
F53B 32E0F4  STA      START
F53C 03B1    OUT      OB1H
F53D 0B2H    IN       OB2H
F53E 0FEH    ANI      OFEH
F53F 03B2    OUT      OB2H
F540 0E0H    IN       OE0H
F541 07H     ANI      07H
F542 0C06F5  CZ       SDUMP
F543 AF      XRA      A
F544 32E0F4  STA      START
F545 03B1    OUT      OB1H
F546 0B2H    IN       OB2H
F547 0FEH    ANI      OFEH
F548 03B2    OUT      OB2H
F549 0E0H    IN       OE0H
F54A 07H     ANI      07H
F54B 0C06F5  CZ       SDUMP
F54C AF      XRA      A
F54D 32E0F4  STA      START
F54E 03B1    OUT      OB1H
F54F 0B2H    IN       OB2H
F550 0FEH    ANI      OFEH
F551 03B2    OUT      OB2H
F552 0E0H    IN       OE0H
F553 07H     ANI      07H
F554 0C06F5  CZ       SDUMP
F555 AF      XRA      A
F556 32E0F4  STA      START
F557 03B1    OUT      OB1H
F558 0B2H    IN       OB2H
F559 0FEH    ANI      OFEH
F55A 03B2    OUT      OB2H
F55B 0E0H    IN       OE0H
F55C 07H     ANI      07H
F55D 0C06F5  CZ       SDUMP
F55E AF      XRA      A
F55F 32E0F4  STA      START
F560 03B1    OUT      OB1H
F561 0B2H    IN       OB2H
F562 0FEH    ANI      OFEH
F563 03B2    OUT      OB2H
F564 0E0H    IN       OE0H
F565 07H     ANI      07H
F566 0C06F5  CZ       SDUMP
F567 AF      XRA      A
F568 32E0F4  STA      START
F569 03B1    OUT      OB1H
F56A 0B2H    IN       OB2H
F56B 0FEH    ANI      OFEH
F56C 03B2    OUT      OB2H
F56D 0E0H    IN       OE0H
F56E 07H     ANI      07H
F56F 0C06F5  CZ       SDUMP
F570 AF      XRA      A
F571 32E0F4  STA      START
F572 03B1    OUT      OB1H
F573 0B2H    IN       OB2H
F574 0FEH    ANI      OFEH
F575 03B2    OUT      OB2H
F576 0E0H    IN       OE0H
F577 07H     ANI      07H
F578 0C06F5  CZ       SDUMP
F579 AF      XRA      A
F57A 32E0F4  STA      START
F57B 03B1    OUT      OB1H
F57C 0B2H    IN       OB2H
F57D 0FEH    ANI      OFEH
F57E 03B2    OUT      OB2H
F57F 0E0H    IN       OE0H
F580 07H     ANI      07H
F581 0C06F5  CZ       SDUMP
F582 AF      XRA      A
F583 32E0F4  STA      START
F584 03B1    OUT      OB1H
F585 0B2H    IN       OB2H
F586 0FEH    ANI      OFEH
F587 03B2    OUT      OB2H
F588 0E0H    IN       OE0H
F589 07H     ANI      07H
F58A 0C06F5  CZ       SDUMP
F58B AF      XRA      A
F58C 32E0F4  STA      START
F58D 03B1    OUT      OB1H
F58E 0B2H    IN       OB2H
F58F 0FEH    ANI      OFEH
F590 03B2    OUT      OB2H
F591 0E0H    IN       OE0H
F592 07H     ANI      07H
F593 0C06F5  CZ       SDUMP
F594 AF      XRA      A
F595 32E0F4  STA      START
F596 03B1    OUT      OB1H
F597 0B2H    IN       OB2H
F598 0FEH    ANI      OFEH
F599 03B2    OUT      OB2H
F59A 0E0H    IN       OE0H
F59B 07H     ANI      07H
F59C 0C06F5  CZ       SDUMP
F59D AF      XRA      A
F59E 32E0F4  STA      START
F59F 03B1    OUT      OB1H
F600 0B2H    IN       OB2H
F601 0FEH    ANI      OFEH
F602 03B2    OUT      OB2H
F603 0E0H    IN       OE0H
F604 07H     ANI      07H
F605 0C06F5  CZ       SDUMP
F606 AF      XRA      A
F607 32E0F4  STA      START
F608 03B1    OUT      OB1H
F609 0B2H    IN       OB2H
F60A 0FEH    ANI      OFEH
F60B 03B2    OUT      OB2H
F60C 0E0H    IN       OE0H
F60D 07H     ANI      07H
F60E 0C06F5  CZ       SDUMP
F60F AF      XRA      A
F610 32E0F4  STA      START
F611 03B1    OUT      OB1H
F612 0B2H    IN       OB2H
F613 0FEH    ANI      OFEH
F614 03B2    OUT      OB2H
F615 0E0H    IN       OE0H
F616 07H     ANI      07H
F617 0C06F5  CZ       SDUMP
F618 AF      XRA      A
F619 32E0F4  STA      START
F61A 03B1    OUT      OB1H
F61B 0B2H    IN       OB2H
F61C 0FEH    ANI      OFEH
F61D 03B2    OUT      OB2H
F61E 0E0H    IN       OE0H
F61F 07H     ANI      07H
F620 0C06F5  CZ       SDUMP
F621 AF      XRA      A
F622 32E0F4  STA      START
F623 03B1    OUT      OB1H
F624 0B2H    IN       OB2H
F625 0FEH    ANI      OFEH
F626 03B2    OUT      OB2H
F627 0E0H    IN       OE0H
F628 07H     ANI      07H
F629 0C06F5  CZ       SDUMP
F62A AF      XRA      A
F62B 32E0F4  STA      START
F62C 03B1    OUT      OB1H
F62D 0B2H    IN       OB2H
F62E 0FEH    ANI      OFEH
F62F 03B2    OUT      OB2H
F630 0E0H    IN       OE0H
F631 07H     ANI      07H
F632 0C06F5  CZ       SDUMP
F633 AF      XRA      A
F634 32E0F4  STA      START
F635 03B1    OUT      OB1H
F636 0B2H    IN       OB2H
F637 0FEH    ANI      OFEH
F638 03B2    OUT      OB2H
F639 0E0H    IN       OE0H
F63A 07H     ANI      07H
F63B 0C06F5  CZ       SDUMP
F63C AF      XRA      A
F63D 32E0F4  STA      START
F63E 03B1    OUT      OB1H
F63F 0B2H    IN       OB2H
F640 0FEH    ANI      OFEH
F641 03B2    OUT      OB2H
F642 0E0H    IN       OE0H
F643 07H     ANI      07H
F644 0C06F5  CZ       SDUMP
F645 AF      XRA      A
F646 32E0F4  STA      START
F647 03B1    OUT      OB1H
F648 0B2H    IN       OB2H
F649 0FEH    ANI      OFEH
F64A 03B2    OUT      OB2H
F64B 0E0H    IN       OE0H
F64C 07H     ANI      07H
F64D 0C06F5  CZ       SDUMP
F64E AF      XRA      A
F64F 32E0F4  STA      START
F650 03B1    OUT      OB1H
F651 0B2H    IN       OB2H
F652 0FEH    ANI      OFEH
F653 03B2    OUT      OB2H
F654 0E0H    IN       OE0H
F655 07H     ANI      07H
F656 0C06F5  CZ       SDUMP
F657 AF      XRA      A
F658 32E0F4  STA      START
F659 03B1    OUT      OB1H
F65A 0B2H    IN       OB2H
F65B 0FEH    ANI      OFEH
F65C 03B2    OUT      OB2H
F65D 0E0H    IN       OE0H
F65E 07H     ANI      07H
F65F 0C06F5  CZ       SDUMP
F660 AF      XRA      A
F661 32E0F4  STA      START
F662 03B1    OUT      OB1H
F663 0B2H    IN       OB2H
F664 0FEH    ANI      OFEH
F665 03B2    OUT      OB2H
F666 0E0H    IN       OE0H
F667 07H     ANI      07H
F668 0C06F5  CZ       SDUMP
F669 AF      XRA      A
F66A 32E0F4  STA      START
F66B 03B1    OUT      OB1H
F66C 0B2H    IN       OB2H
F66D 0FEH    ANI      OFEH
F66E 03B2    OUT      OB2H
F66F 0E0H    IN       OE0H
F670 07H     ANI      07H
F671 0C06F5  CZ       SDUMP
F672 AF      XRA      A
F673 32E0F4  STA      START
F674 03B1    OUT      OB1H
F675 0B2H    IN       OB2H
F676 0FEH    ANI      OFEH
F677 03B2    OUT      OB2H
F678 0E0H    IN       OE0H
F679 07H     ANI      07H
F67A 0C06F5  CZ       SDUMP
F67B AF      XRA      A
F67C 32E0F4  STA      START
F67D 03B1    OUT      OB1H
F67E 0B2H    IN       OB2H
F67F 0FEH    ANI      OFEH
F680 03B2    OUT      OB2H
F681 0E0H    IN       OE0H
F682 07H     ANI      07H
F683 0C06F5  CZ       SDUMP
F684 AF      XRA      A
F685 32E0F4  STA      START
F686 03B1    OUT      OB1H
F687 0B2H    IN       OB2H
F688 0FEH    ANI      OFEH
F689 03B2    OUT      OB2H
F68A 0E0H    IN       OE0H
F68B 07H     ANI      07H
F68C 0C06F5  CZ       SDUMP
F68D AF      XRA      A
F68E 32E0F4  STA      START
F68F 03B1    OUT      OB1H
F690 0B2H    IN       OB2H
F691 0FEH    ANI      OFEH
F692 03B2    OUT      OB2H
F693 0E0H    IN       OE0H
F694 07H     ANI      07H
F695 0C06F5  CZ       SDUMP
F696 AF      XRA      A
F697 32E0F4  STA      START
F698 03B1    OUT      OB1H
F699 0B2H    IN       OB2H
F69A 0FEH    ANI      OFEH
F69B 03B2    OUT      OB2H
F69C 0E0H    IN       OE0H
F69D 07H     ANI      07H
F69E 0C06F5  CZ       SDUMP
F69F AF      XRA      A
F700 32E0F4  STA      START
F701 03B1    OUT      OB1H
F702 0B2H    IN       OB2H
F703 0FEH    ANI      OFEH
F704 03B2    OUT      OB2H
F705 0E0H    IN       OE0H
F706 07H     ANI      07H
F707 0C06F5  CZ       SDUMP
F708 AF      XRA      A
F709 32E0F4  STA      START
F70A 03B1    OUT      OB1H
F70B 0B2H    IN       OB2H
F70C 0FEH    ANI      OFEH
F70D 03B2    OUT      OB2H
F70E 0E0H    IN       OE0H
F70F 07H     ANI      07H
F710 0C06F5  CZ       SDUMP
F711 AF      XRA      A
F712 32E0F4  STA      START
F713 03B1    OUT      OB1H
F714 0B2H    IN       OB2H
F715 0FEH    ANI      OFEH
F716 03B2    OUT      OB2H
F717 0E0H    IN       OE0H
F718 07H     ANI      07H
F719 0C06F5  CZ       SDUMP
F71A AF      XRA      A
F71B 32E0F4  STA      START
F71C 03B1    OUT      OB1H
F71D 0B2H    IN       OB2H
F71E 0FEH    ANI      OFEH
F71F 03B2    OUT      OB2H
F720 0E0H    IN       OE0H
F721 07H     ANI      07H
F722 0C06F5  CZ       SDUMP
F723 AF      XRA      A
F724 32E0F4  STA      START
F725 03B1    OUT      OB1H
F726 0B2H    IN       OB2H
F727 0FEH    ANI      OFEH
F728 03B2    OUT      OB2H
F729 0E0H    IN       OE0H
F72A 07H     ANI      07H
F72B 0C06F5  CZ       SDUMP
F72C AF      XRA      A
F72D 32E0F4  STA      START
F72E 03B1    OUT      OB1H
F72F 0B2H    IN       OB2H
F730 0FEH    ANI      OFEH
F731 03B2    OUT      OB2H
F732 0E0H    IN       OE0H
F733 07H     ANI      07H
F734 0C06F5  CZ       SDUMP
F735 AF      XRA      A
F736 32E0F4  STA      START
F737 03B1    OUT      OB1H
F738 0B2H    IN       OB2H
F739 0FEH    ANI      OFEH
F73A 03B2    OUT      OB2H
F73B 0E0H    IN       OE0H
F73C 07H     ANI      07H
F73D 0C06F5  CZ       SDUMP
F73E AF      XRA      A
F73F 32E0F4  STA      START
F740 03B1    OUT      OB1H
F741 0B2H    IN       OB2H
F742 0FEH    ANI      OFEH
F743 03B2    OUT      OB2H
F744 0E0H    IN       OE0H
F745 07H     ANI      07H
F746 0C06F5  CZ       SDUMP
F747 AF      XRA      A
F748 32E0F4  STA      START
F749 03B1    OUT      OB1H
F74A 0B2H    IN       OB2H
F74B 0FEH    ANI      OFEH
F74C 03B2    OUT      OB2H
F74D 0E0H    IN       OE0H
F74E 07H     ANI      07H
F74F 0C06F5  CZ       SDUMP
F750 AF      XRA      A
F751 32E0F4  STA      START
F752 03B1    OUT      OB1H
F753 0B2H    IN       OB2H
F754 0FEH    ANI      OFEH
F755 03B2    OUT      OB2H
F756 0E0H    IN       OE0H
F757 07H     ANI      07H
F758 0C06F5  CZ       SDUMP
F759 AF      XRA      A
F75A 32E0F4  STA      START
F75B 03B1    OUT      OB1H
F75C 0B2H    IN       OB2H
F75D 0FEH    ANI      OFEH
F75E 03B2    OUT      OB2H
F75F 0E0H    IN       OE0H
F760 07H     ANI      07H
F761 0C06F5  CZ       SDUMP
F762 AF      XRA      A
F763 32E0F4  STA      START
F764 03B1    OUT      OB1H
F765 0B2H    IN       OB2H
F766 0FEH    ANI      OFEH
F767 03B2    OUT      OB2H
F768 0E0H    IN       OE0H
F769 07H     ANI      07H
F76A 0C06F5  CZ       SDUMP
F76B AF      XRA      A
F76C 32E0F4  STA      START
F76D 03B1    OUT      OB1H
F76E 0B2H    IN       OB2H
F76F 0FEH    ANI      OFEH
F770 03B2    OUT      OB2H
F771 0E0H    IN       OE0H
F772 07H     ANI      07H
F773 0C06F5  CZ       SDUMP
F774 AF      XRA      A
F775 32E0F4  STA      START
F776 03B1    OUT      OB1H
F777 0B2H    IN       OB2H
F778 0FEH    ANI      OFEH
F779 03B2    OUT      OB2H
F77A 0E0H    IN       OE0H
F77B 07H     ANI      07H
F77C 0C06F5  CZ       SDUMP
F77D AF      XRA      A
F77E 32E0F4  STA      START
F77F 03B1    OUT      OB1H
F780 0B2H    IN       OB2H
F781 0FEH    ANI      OFEH
F782 03B2    OUT      OB2H
F783 0E0H    IN       OE0H
F784 07H     ANI      07H
F785 0C06F5  CZ       SDUMP
F786 AF      XRA      A
F787 32E0F4  STA      START
F788 03B1    OUT      OB1H
F789 0B2H    IN       OB2H
F78A 0FEH    ANI      OFEH
F78B 03B2    OUT      OB2H
F78C 0E0H    IN       OE0H
F78D 07H     ANI      07H
F78E 0C06F5  CZ       SDUMP
F78F AF      XRA      A
F790 32E0F4  STA      START
F791 03B1    OUT      OB1H
F792 0B2H    IN       OB2H
F793 0FEH    ANI      OFEH
F794 03B2    OUT      OB2H
F795 0E0H    IN       OE0H
F796 07H     ANI      07H
F797 0C06F5  CZ       SDUMP
F798 AF      XRA      A
F799 32E0F4  STA      START
F79A 03B1    OUT      OB1H
F79B 0B2H    IN       OB2H
F79C 0FEH    ANI      OFEH
F79D 03B2    OUT      OB2H
F79E 0E0H    IN       OE0H
F79F 07H     ANI      07H
F800 0C06F5  CZ       SDUMP
F801 AF      XRA      A
F802 32E0F4  STA      START
F803 03B1    OUT      OB1H
F804 0B2H    IN       OB2H
F805 0FEH    ANI      OFEH
F806 03B2    OUT      OB2H
F807 0E0H    IN       OE0H
F808 07H     ANI      07H
F809 0C06F5  CZ       SDUMP
F80A AF      XRA      A
F80B 32E0F4  STA      START
F80C 03B1    OUT      OB1H
F80D 0B2H    IN       OB2H
F80E 0FEH    ANI      OFEH
F80F 03B2    OUT      OB2H
F810 0E0H    IN       OE0H
F811 07H     ANI      07H
F812 0C06F5  CZ       SDUMP
F813 AF      XRA      A
F814 32E0F4  STA      START
F815 03B1    OUT      OB1H
F816 0B2H    IN       OB2H
F817 0FEH    ANI      OFEH
F818 03B2    OUT      OB2H
F819 0E0H    IN       OE0H
F81A 07H     ANI      07H
F81B 0C06F5  CZ       SDUMP
F81C AF      XRA      A
F81D 32E0F4  STA      START
F81E 03B1    OUT      OB1H
F81F 0B2H    IN       OB2H
F820 0FEH    ANI      OFEH
F821 03B2    OUT      OB2H
F822 0E0H    IN       OE0H
F823 07H     ANI      07H
F824 0C06F5  CZ       SDUMP
F825 AF      XRA      A
F826 32E0F4  STA      START
F827 03B1    OUT      OB1H
F828 0B2H    IN       OB2H
F829 0FEH    ANI      OFEH
F82A 03B2    OUT      OB2H
F82B 0E0H    IN       OE0H
F82C 07H     ANI      07H
F82D 0C06F5  CZ       SDUMP
F82E AF      XRA      A
F82F 32E0F4  STA      START
F830 03B1    OUT      OB1H
F831 0B2H    IN       OB2H
F832 0FEH    ANI      OFEH
F833 03B2    OUT      OB2H
F834 0E0H    IN       OE0H
F835 07H     ANI      07H
F836 0C06F5  CZ       SDUMP
F837 AF      XRA      A
F838 32E0F4  STA      START
F839 03B1    OUT      OB1H
F83A 0B2H    IN       OB2H
F83B 0FEH    ANI      OFEH
F83C 03B2    OUT      OB2H
F83D 0E0H    IN       OE0H
F83E 07H     ANI      07H
F83F 0C06F5  CZ       SDUMP
F840 AF      XRA      A
F841 32E0F4  STA      START
F842 03B1    OUT      OB1H
F843 0B2H    IN       OB2H
F844 0FEH    ANI      OFEH
F845 03B2    OUT      OB2H
F846 0E0H    IN       OE0H
F847 07H     ANI      07H
F848 0C06F5  CZ       SDUMP
F849 AF      XRA      A
F84A 32E0F4  STA      START
F84B 03B1    OUT      OB1H
F84C 0B2H    IN       OB2H
F84D 0FEH    ANI      OFEH
F84E 03B2    OUT      OB2H
F84F 0E0H    IN       OE0H
F850 07H     ANI      07H
F851 0C06F5  CZ       SDUMP
F852 AF      XRA      A
F853 32E0F4  STA      START
F854 03B1    OUT      OB1H
F855 0B2H    IN       OB2H
F856 0FEH    ANI      OFEH
F857 03B2    OUT      OB2H
F858 0E0H    IN       OE0H
F859 07H     ANI      07H
F85A 0C06F5  CZ       SDUMP
F85B AF      XRA      A
F85C 32E0F4  STA      START
F85D 03B1    OUT      OB1H
F85E 0B2H    IN       OB2H
F85F 0FEH    ANI      OFEH
F860 03B2    OUT      OB2H
F861 0E0H    IN       OE0H
F862 07H     ANI      07H
F863 0C06F5  CZ       SDUMP
F864 AF      XRA      A
F865 32E0F4  STA      START
F866 03B1    OUT      OB1H
F867 0B2H    IN       OB2H
F868 0FEH    ANI      OFEH
F869 03B2    OUT      OB2H
F86A 0E0H    IN       OE0H
F86B 07H     ANI      07H
F86C 0C06F5  CZ       SDUMP
F86D AF      XRA      A
F86E 32E0F4  STA      START
F86F 03B1    OUT      OB1H
F870 0B2H    IN       OB2H
F871 0FEH    ANI      OFEH
F872 03B2    OUT      OB2H
F873 0E0H    IN       OE0H
F874 07H     ANI      07H
F875 0C06F5  CZ       SDUMP
F876 AF      XRA      A
F877 32E0F4  STA      START
F878 03B1    OUT      OB1H
F879 0B2H    IN       OB2H
F87A 0FEH    ANI      OFEH
F87B 03B2    OUT      OB2H
F87C 0E0H    IN       OE0H
F87D 07H     ANI      07H
F87E 0C06F5  CZ       SDUMP
F87F AF      XRA      A
F880 32E0F4  STA      START
F881 03B1    OUT      OB1H
F882 0B2H    IN       OB2H
F883 0FEH    ANI      OFEH
F884 03B2    OUT      OB2H
F885 0E0H    IN       OE0H
F886 07H     ANI      07H
F887 0C06F5  CZ       SDUMP
F888 AF      XRA      A
F889 32E0F4  STA      START
F88A 03B1    OUT      OB1H
F88B 0B2H    IN       OB2H
F88C 0FEH    ANI      OFEH
F88D 03B2    OUT      OB2H
F88E 0E0H    IN       OE0H
F88F 07H     ANI      07H
F890 0C06F5  CZ       SDUMP
F891 AF      XRA      A
F892 32E0F4  STA      START
F893 03B1    OUT      OB1H
F894 0B2H    IN       OB2H
F895 0FEH    ANI      OFEH
F896 03B2    OUT      OB2H
F897 0E0H    IN       OE0H
F898 07H     ANI      07H
F899 0C06F5  CZ       SDUMP
F89A AF      XRA      A
F89B 32E0F4  STA      START
F89C 03B1    OUT      OB1H
F89D 0B2H    IN       OB2H
F89E 0FEH    ANI      OFEH
F89F 03B2    OUT      OB2H
F89A 0E0H    IN       OE0H
F89B 07H     ANI      07H
F89C 0C06F5  CZ       SDUMP
F89D AF      XRA      A
F89E 32E0F4  STA      START
F89F 03B1    OUT      OB1H
F89A 0B2H    IN       OB2H
F89B 0FEH    ANI      OFEH
F89C 03B2    OUT      OB2H
F89D 0E0H    IN       OE0H
F89E 07H     ANI      07H
F89F 0C06F5  CZ       SDUMP
F89A AF      XRA      A
F89B 32E0F4  STA      START
F89C 03B1    OUT      OB1H
F89D 0B2H    IN       OB2H
F89E 0FEH    ANI      OFEH
F89F 03B2    OUT      OB2H
F89A 0E0H    IN       OE0H
F89B 07H     ANI      07H
F89C 0C06F5  CZ       SDUMP
F89D AF      XRA      A
F89E 32E0F4  STA      START
F89F 03B1    OUT      OB1H
F89A 0B2H    IN       OB2H
F89B 0FEH    ANI      OFEH
F89C 03B2    OUT      OB2H
F89D 0E0H    IN       OE0H
F89E 07H     ANI      07H
F89F 0C06F5  CZ       SDUMP
F89A AF      XRA      A
F89B 32E0F4  STA      START
F89C 03B1    OUT      OB1H
F89D 0B2H    IN       OB2H
F89E 0FEH    ANI      OFEH
F89F 03B2    OUT      OB2H
F89A 0E0H    IN       OE0H
F89B 07H     ANI      07H
F89C 0C06F5  CZ       SDUMP
F89D AF      XRA      A
F89E 32E0F4  STA      START
F89F 03B1    OUT      OB1H
F89A 0B2H    IN       OB2H
F89B 0FEH    ANI      OFEH
F89C 03B2    OUT      OB2H
F89D 0E0H    IN       OE0H
F89E 07H     ANI      07H
F89F 0C06F5  CZ       SDUMP
F89A AF      XRA      A
F89B 32E0F4  STA      START
F89C 03B1    OUT      OB1H
F89D 0B2H    IN       OB2H
F89E 0FEH    ANI      OFEH
F89F 03B2    OUT      OB2H
F89A 0E0H    IN       OE0H
F89B 07H     ANI      07H
F89C 0C06F5  CZ       SDUMP
F89D AF      XRA      A
F89E 32E0F4  STA      START
F89F 03B1    OUT      OB1H
F89A 0B2H    IN       OB2H
F89B 0FEH    ANI      OFEH
F89C 03B2    OUT      OB2H
F89D 0E0H    IN       OE0H
F89E 07H     ANI      07H
F89F 0C06F5  CZ       SDUMP
F89A AF      XRA      A
F89B 32E0F4  STA      START
F89C 03B1    OUT      OB1H
F89D 0B2H    IN       OB2H
F89E 0FEH    ANI      OFEH
F89F 03B2    OUT      OB2H
F89A 0E0H    IN       OE0H
F89B 07H     ANI      07H
F89C 0C06F5  CZ       SDUMP
F89D AF      XRA      A
F89E 32E0F4  STA      START
F89F 03B1    OUT      OB1H
F89A 0B2H    IN       OB2H
F89B 0FEH    ANI      OFEH
F89C 03B2    OUT      OB2H
F89D 0E0H    IN       OE0H
F89E 07H     ANI      07H
F89F 0C06F5  CZ       SDUMP
F89A AF      XRA      A
F89B 32E0F4  STA      START
F89C 03B1    OUT      OB1H
F89D 0B2H   
```



```

F589 LDA LSTAT ;Restore Label status
F58C STA OF63DH
F58F LDA CSTAT ;Restore cursor ON/OFF stat
F592 ORA A
F593 CNZ C449H
F596 LHL D OLCUR
F599 XCHG
F59A DCR D
F59B DCR E
F59C CALL SETCUR
F59F DJNZ ;disable interrupts and return
F5A0 RET
F5A1 C9
F5A4 STA CONV
F5A7 MVI H,B ;Conversion routine
F5A8 H,B ;reverses positions of bit
F5A9 LXI BC,1 ; in a byte
F5AB LDA COL
F5AC ANA C ;le.g. 10111010
F5AD MOV A,B ;le.g. 0111101
F5AE BTE ; 0101101
F5AF CMC
F5B0 RAL
F5B1 CPO
F5B4 MOV B,A
F5B5 MOV A,C
F5B6 STC
F5B7 CMC
F5B8 RAL
F5B9 MOV C,A
F5BA DCR H
F5BB JNZ CLOOP
F5BE MOV A,B
F5BF RET
F5C0 A1
F5C1 RET
F5C2 DEF B
F5C3 LXI HL,STRTUP
F5C4 SETPTR
F5C7 MOV C,I
F5C8 CFI
F5C9 RZ
F5CA CALL 6D3FH
F5CB JNZ HL
F5CC JMP SETPTR
F5CD MOV A,Y
F5CE MOV A,E
F5CF CALL 4270H
F5D0 MOV A,E
F5D1 ADI 20H
F5D2 RST 4
F5D3 MOV A,D
F5D4 ADI 20H
F5D5 RST 4
F5D6 RET

```

```

F5E0 1B STRCHR DEF B 1B
F5E1 41 DEF B 'A'
F5E2 0BFF DEF B OFFOH
F5E3 1B ENDCR DEF B 1B
F5E4 32 DEF B 2
F5E5 FF DEF B OFFH
F5E6 1B SETCHR DEF B 1B
F5E7 4B DEF B 'K'
F5E8 F00 DEF B 00FOH
F5E9 FF DEF B OFFH
F5EA 00 DEF B 0
F5EB 00 DEF B 0
F5EC 00 CSTAT DEF B 0
F5ED 00 LSTAT DEF B 0
F5EE 00 END
F5EF F4C2 INIT
F5F0 START
F5F1 EXIT1
F5F2 EXIT2
F5F3 SDUMP
F5F4 MLOOP
F5F5 MLOOP2
F5F6 DEL
F5F7 F534
F5F8 MLOOP3
F5F9 END
F5FA CONV
F5FB CLOOP
F5FC COL
F5FD STRUP
F5FE SETPTR
F5FF SETCUR
F600 STRCHR
F601 ENDCR
F602 SETCHR
F603 OLCUR
F604 CSTAT
F605 LSTAT
F606 STARTING ADDRESS F4C2 62658
F607 ENTRY ADDRESS F5EF 62959
F608 PROGRAM LENGTH 012E 302

```



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## Program Listing 2

```

10 CLEAR 256,MAX RAM-302
   : MX=MAX RAM
   : ML=MX-302
20 CLS
   : GOSUB 700
30 NA=PEEK(62976)+PEEK(62977)*256
40 IF NA=ML+30 THEN 500
50 INPUT "Load and activate screen
   dump":Q$
60 Q$=LEFT$(Q$,1)
   : IF Q$="N" OR Q$="n" THEN CLEAR
     256,MX
   : MENU
100 FOR X=0 TO 301
   : READ A
   : IF A=-1 THEN GOSUB 200
110 POKE ML+X,A
120 NEXT
140 CALL ML
150 MENU
200 READ B,C
   : B=B+C*256+ML
   : C=INT(B/256)
   : B=B-C*256
   : A=B
   : POKE ML+X,A

```

**LOADS AND EXECUTES.** Listing two is a Basic program that loads and executes the routine. If you have an assembler, you may want to type in the source code directly and save it to a machine-language filename. This can save time in loading the routine from tape when it's needed.

POKE 62975,0: CLEAR 256, MAX-RAM will remove the routine if necessary. *Warning . . .* if you don't give the actual machine code a filename, do *not* run it if the routine is already present. Your machine will cold start and your files will disappear into limbo. The Basic program will warn you if the routine is already activated and will remove it for you if you wish.

If you key in the Basic program, it's advisable that you save all your files before running in case you mistyped a number. A wrong number also can send you into limbo. In the event you wish to relocate this routine, I've tried to isolate all of the memory locations within the machine-language program. They're all in data statements ending with 5. Line 20 contains the beginning of the routine within clear and as variable ML. ◀

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# SCREEN DUMP

```

: X=X+1
: A=C
: RETURN
500 PRINT "Routine already activated."
510 INPUT "Remove routine";Q$
: Q$=LEFT$(Q$,1)
520 IF Q$="Y" OR Q$="y" THEN POKE
62975,PEEK(ML+65)
: POKE 62976,PEEK(ML+66)
: POKE 62977,PEEK(ML+67)
: CLEAR 256,MX
: PRINT "R-e-m-o-v-e-d"
: FOR R=1 TO 100
: NEXT
: MENU
530 PRINT "Routine still in place"
: FOR R=1 TO 100
: NEXT
: MENU
700 P$=CHR$(27)+"p"
: Q$=CHR$(27)+"q"
: PRINT "EPSON Screen dump
710 PRINT " By -Dave Cloutier-
720 PRINT "--> "P$"CTRL+GRPH
+SHIFT"Q$" to dump screen
730 PRINT "--> "P$"CODE+SHIFT"Q$" to
cancel during dump
740 PRINT "Routine occupies memory
locations"
: PRINT ML"to"ML+301
: RETURN
1000 DATA 0, 58, 255, 245, 50
1005 DATA -1, 65, 0
1010 DATA 42, 0, 246, 34
1015 DATA -1, 66, 0
1020 DATA 62, 195, 50, 255, 245, 33
1025 DATA -1, 30, 0
1030 DATA 34, 0, 246, 62, 201, 50
1035 DATA -1, 0, 0
1040 DATA 201, 0, 245, 197, 213
1050 DATA 229, 62, 201, 50
1055 DATA -1, 30, 0
1060 DATA 62, 255, 211, 177, 219, 178,
230
1070 DATA 254, 211, 178, 219, 224
1080 DATA 230, 7, 204
1085 DATA -1, 68, 0
1090 DATA 175, 50
1095 DATA -1, 30, 0
2000 DATA 225, 209, 193, 241, 0, 0, 0,
251, 42, 57, 246, 34
2005 DATA -1, 298, 0
2010 DATA 58, 63, 246, 50
2015 DATA -1, 300, 0
2020 DATA 58, 61, 246, 50
2025 DATA -1, 301, 0
2030 DATA 175, 50, 61, 246, 205, 73,
66, 17
2040 DATA 0, 0, 205
2045 DATA -1, 258, 0

```

```

2050 DATA 33
2055 DATA -1, 293, 0
2060 DATA 205
2065 DATA -1, 261, 0
2070 DATA 213, 205
2075 DATA -1, 272, 0
2080 DATA 209, 213, 62, 3, 61, 245,
62, 0, 61, 194
2085 DATA -1, 118, 0
2090 DATA 241, 194
2095 DATA -1, 114, 0
2097 DATA 205, 78, 66, 33, 236, 255,
126, 229
3000 DATA 205
3005 DATA -1, 223, 0
3010 DATA 225, 205, 63, 109, 35, 125,
254, 242, 194
3025 DATA -1, 132, 0
3030 DATA 205, 73, 66, 209, 20, 122,
254, 40, 194
3035 DATA -1, 106, 0
3040 DATA 62, 13, 205, 63, 109, 62
3050 DATA 255, 211, 177, 219, 178, 230
3060 DATA 254, 211, 178, 219, 224, 230
3070 DATA 9, 202
3075 DATA -1, 190, 0
3080 DATA 22, 0, 28, 123, 254, 8, 194
3085 DATA -1, 100, 0
3090 DATA 205, 78, 66, 33
3095 DATA -1, 290, 0
4000 DATA 205
4005 DATA -1, 261, 0
4010 DATA 58
4015 DATA -1, 301, 0
4020 DATA 50, 61, 246, 58
4025 DATA -1, 300, 0
4030 DATA 183, 196, 73, 66, 42
4035 DATA -1, 298, 0
4040 DATA 235, 21, 29, 205
4045 DATA -1, 272, 0
4050 DATA 243, 201, 50
4055 DATA -1, 257, 0
4060 DATA 38, 8, 1, 1, 0, 58
4065 DATA -1, 257, 0
4070 DATA 161, 120, 55, 63, 23, 228
4075 DATA -1, 254, 0
4080 DATA 71, 121, 55, 63, 23, 79, 37,
194
4085 DATA -1, 231, 0
4090 DATA 120, 201, 198, 1, 201, 0,
33
4095 DATA -1, 286, 0
5000 DATA 126, 254, 255, 200, 205,
63, 109, 35, 195
5005 DATA -1, 261, 0
5010 DATA 62, 89, 205, 112, 66
5020 DATA 123, 198, 32, 231, 122, 198
5030 DATA 32, 231, 201, 27, 65, 8, 255
5040 DATA 27, 50, 255, 27, 75, 240, 0
5050 DATA 255, 0, 0, 0, 0

```

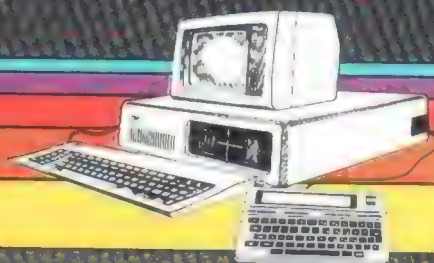


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Spreadsheets sold the public on the potential of microcomputers.  
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---

By Woods Martin

---

*Editor's Note: Spread is based on Mini-VC, a spreadsheet refined over several months by members of the Model 100 Special Interest Group on CompuServe. The original program was written by Terry Dettman and appeared in Basic Computing. This version of the program incorporates ideas from SIG members Don Hergert, Gary Bender, Chris Young, and Joel Hassel.*

**S**preadsheets. That's what accountants call those desk-sized expanses of ruled paper they use to tabulate endless columns and rows of figures. Ledgers, journals, statements; simple or complex; large or small . . . all are spreadsheets.

But spreadsheets aren't just for bookkeeping. Most of us use a familiar spreadsheet daily: the ordinary calendar divided into columns of days and rows of weeks. Often the date is printed inside a little box with room for notes like *wife's birthday*, or *dentist—3 p.m.*

That could be called the date box or simply an element of the calendar. If it's Thursday in the third week of July 1984, the element at the intersection of the Thursday column and the third week row is the date, the 18th. The calendar for one month is a visual representation of all the dates in the month organized in an easy-to-use way. Call it a model of the month.

**PAPER TO MEDIA.** In computerland, spreadsheets aren't paper but software, programs making the display screen behave like the accountant's big ruled sheets. Simple typing and commands build a model of columns and rows full of many elements which can contain anything: dates, names, prices, scores, discounts, complex equations.

On the wall above my 100 I've a one month calendar with slick surface I write on with water soluble ink. I use it to keep up with appointments and special events. If someone cancels, a damp cloth quickly blanks out the entry. At the end of the month, I erase the

whole thing and set it up again, building a model of the next month. A spreadsheet program can do that (though probably not as well) and much more.

For example, I'm a salesman and use my slick wall calendar to record the number of calls and the amount of sales for each day. At the end of the month, I want to keep a permanent record and total my sales by week for the month.

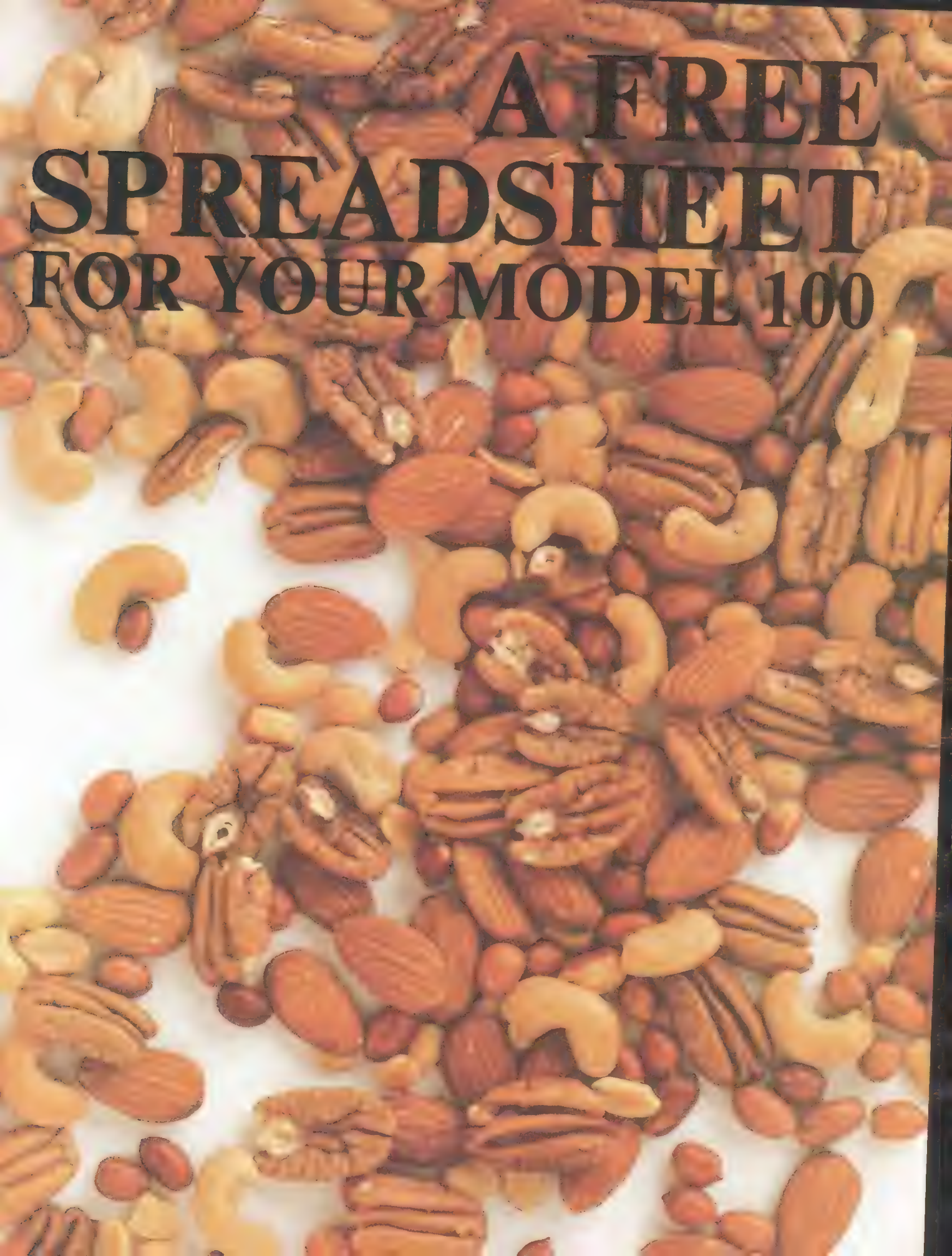
I also can figure my daily average sales, sales-per-call, and which day of the week would cost me the least to take off and play golf. Although only simple data and questions, it'd take me a lot longer to get it all with pencil, paper, and calculator. My 100 and a spreadsheet program do it automatically.

**POPULAR PROGRAMS.** Spreadsheets are some of the most popular programs sold today. In many ways they're universal programs. Scores of books have been written about them, and magazine articles and newsletters are full of applications. As a businessman, I realize the reasons for their success.

A spreadsheet makes the computer work like I think. I don't have to learn a lot of new concepts and yet the machine does all the grunt work. This is the microcomputer community's contribution to programming philosophy and it's changing the data-processing world.

There are several commercial spreadsheets available for the 100. Then there's Spread (program listing 1). It's free and can be obtained in several ways (see Preview, page 6).

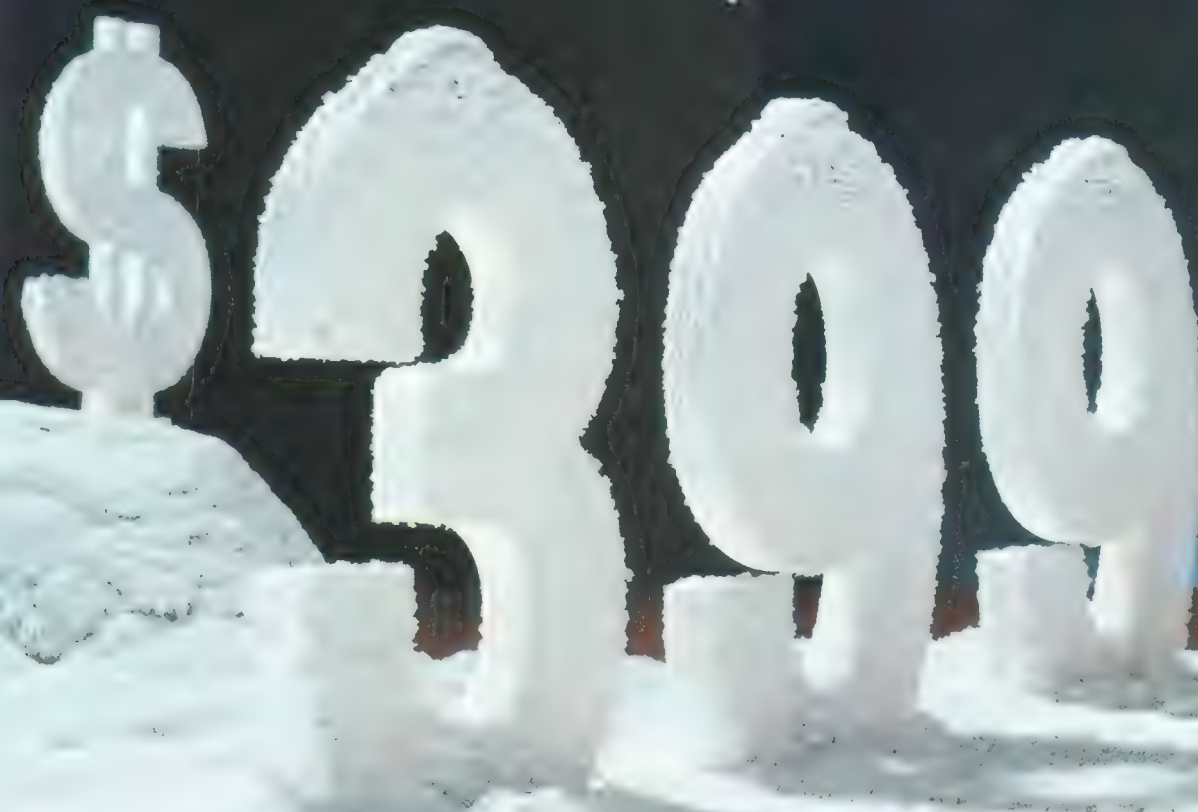




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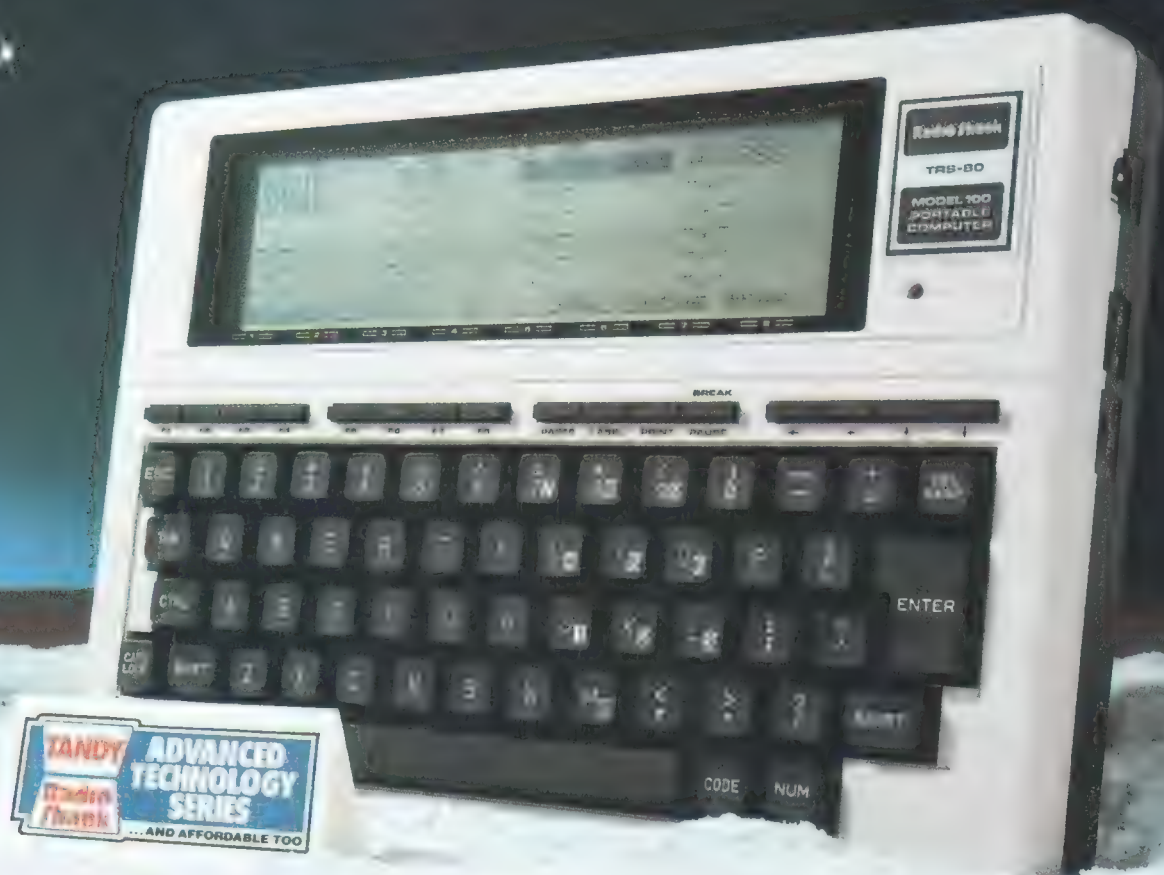
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**STARTING UP.** Normally the caps lock key should be released to allow lower-case entry of labels. Conversion to uppercase is automatic when required.

From the main menu, move the cursor to spread and press enter. The default settings — spr cm=T rm= 20 p=S <=ENTER or new cm? — will display on the first line of the screen called the command line.



Press enter to accept the defaults. Later on a new column width can be entered if needed for skinny or fat models; the maximum row width will be recalculated and a choice of single or double precision requested. The new parameters are displayed for acceptance of additional changes.

The program notes the highest column and row accessed and stores this data with each model file. If the cm or rm values are reduced below model size, that fact will be reported on the next attempt to load the model and a restart will be requested.

**BLANK MODEL.** The blank model will appear with the memory message on the command line and the first five rows of the model (see exhibit 1). If the Disk-Video Interface is enabled, rows 6 through 20 also will be displayed.

This will remain on the screen briefly but can be reviewed at any time by the /



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\*optional

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M command. In addition to cm, rm, and precision, f=0 indicates default integer format (0 decimal places), o=C recalculation order by columns, ## ##m unused memory and 3000s available string space.

Now let's build a model. The Penurious Peanut Company sells cans of mixed nuts in discount stores consisting of peanuts, cashews, almonds, and pecans. Usually 60 percent are peanuts, and the rest of the mix depends on the nut market which swings wildly.

The current element should be A0 as indicated by the reverse video block under the column A header. The legend A0 to the header's left is the Element Register. If the reverse video block is not located in A0, press the arrow keys until it is.

**ENTERING LABELS.** Type Item. Note In>, denoting input mode, appeared in the upper left corner as soon as "I" was pressed (exhibit 2). Also note Item appears directly over the A header block, making it easy to align text (or labels) within an element.

Press enter. Item now also appears in reverse video in the current element. It remains on the command line with the cursor blinking over the I and an L>, marking the element as a label (exhibit 3).

Press the right arrow. The current element moves to B0. Type "Pct by wt" and this time press the right arrow. The label appears below B, but the current element is now C0. Type two spaces followed by "Cost/lb" and press the right arrow. Follow with "Cost/can," but this time press enter because we want this first model to fit on one screen.

**MOVING AROUND.** Now press shift-> and "GOTO:" will display on the command line. Type A1 and press enter. (Don't worry about uppercase. Spread will take care of that.)

The current element is now A1. Type "Peanuts." Press the down arrow. Type "Pecans." Continue down the column typing "Cashews," "Almonds," and finally "Total." Press enter. Your model should look like exhibit 4.

Now you're ready for the numbers. Percent is to be an integer (zero decimal places) but cost/can and cost/lb are three decimals.

You can save time by setting a global numeric format. Press / (the command line appears) and G (Global: O F W appears). Now press F (Format: Decimal

0-7 or S appears). You don't have to wait for each message, /GF all together will do the same thing. Press 3 for three decimal places and the current element returns to A5.

Want to check? Press /M. That refreshes the screen and briefly displays all the model parameters before returning to the current element.

Type >B1 enter (remember to shift for >) and then type 60 and enter. What appears is 60.000 (exhibit 5), while the upper left corner shows V>60 (60 is the definition of element B1 which is marked as a value). Note the current element display is three decimal places which is the default you set; zero is required.

**CORRECTING VALUES.** Press /F0 and the current element will display 60. Press the right arrow. Type .338 and enter. The upper left corner is V>.338 (definition) and the current element shows the same 0.338—default format!

Now move to element D1 by pressing the right arrow (or >D1). Type +B1\*C1/100 enter. The upper left corner is F>+B1\*C1/100 (Formula Definition) but the current element is 0.203. We told Spread to take the positive value of element B1 and multiply it by the value of element C1 and divide the product by 100 (exhibit 6).

**REPLICATION.** With the current element D1, let's try an advanced command. Press /R for replicate and "Source:D1" appears on the command line with the cursor blinking over the D. We're going to copy or replicate the formula in D1 into elements D2, D3, and D4, to avoid extra typing and possible mistakes.

Press enter to accept D1 as the beginning of the source element. "D1...D1" shows with the cursor blinking over the second D. Press enter to accept D1 as ending of the source element. "Target:" appears. Type D2 and enter. The cursor will blink over the second D of "D2...D2". Type D4 enter.

The upper left corner shows "+B1<rep R N" with D2 displayed below in the element register (exhibit 7). The <rep means replicate, R means use a relative offset in the new element, while N indicates no change for the term. Press R. Now the <rep points to term \*C1. Press R again. The element register sequences from D2 to D4, the screen refreshes and zeros appear in elements D2 to D4 (exhibit 8).

The current element is still D1. Use the down arrow to examine the definition in D2, D3, and D4 and note the element references are correct.

**SUMMING A COLUMN.** Type >D5 and enter, then @ SUM(D1,D4) and enter. The upper left corner is F>@SUM(D1,D4) and the current element shows 0.203. The definition is the sum of the value of elements D1 through D4.

Type >B2 and enter. Type 10 and enter. Correct the format with /F0.

Press the down arrow and enter 5. Correct the format.

Press the down arrow and enter 100-B1-B2-B3. Correct the format. Since the total can't exceed 100 percent, a formula is used for almonds.

Just for appearance, 100 should be displayed in element B5. Move the cursor to B5, enter @SUM(B1,B4), and correct the format. Spread should appear as it does in exhibit 9.

Pecans are \$1.850 per pound, cashews are \$2.437 and almonds are \$1.024. Enter these values into C2, C3, and C4 (remember >GOTO:?).

**RECALCULATE.** Now the finale. Press shift-! and the upper left corner shows !C—recalculate by columns—and a sequence of elements appear in the element register. The screen refreshes and \$0.766 appears in element D5 as the total cost per can (exhibit 10).

Almonds get more expensive than pecans? Try a different percentage. You can vary both cost and percentage and immediately recalculate the total cost per can. Just type in your new values and press shift-! to recalculate.

Before you quit, save your model. Press /SS. "Save File:" appears on the command line. Type NUTS1 and enter. Watch the element register as the model is saved. Now press /SQ followed by Y to quit and return to the menu. If you were using a DVI, the display is switched back to LCD to avoid difficulties when you power down.

There are some problems with this model. It's possible to enter percentages of peanuts, pecans, and cashews, that go over 100 and force almonds to a negative number. Even the Penurious Peanut Company wouldn't go that far.

Spread has functions that will prevent that and also enforce the minimum 5 percent content for each variety. Those and other things I'll discuss next month. ◀



spr cm=T rm= 20 p=S f=0 o=C 656m 3000s  
wm 3 A B C D

0  
1  
2  
3  
4  
5

Exhibit 1. Entering Spread.

F)+B1\*C1/100

D	1	A	B	C	D
0	Item	Pct by wt	Cost/lb	Cost/can	
1	Peanuts	60	0.338	0.203	
2	Pecans				
3	Cashews				
4	Almonds				
5	Total				

Exhibit 6. Formula Definition.

In>Item

A 0 A B C D  
0  
1  
2  
3  
4  
5

Exhibit 2. Input Mode.

+B1<rep R N

D	2	A	B	C	D
0	Item	Pct by wt	Cost/lb	Cost/can	
1	Peanuts	60	0.338	0.203	
2	Pecans				
3	Cashews				
4	Almonds				
5	Total				

Exhibit 7. Spread Ready to Replicate.

L>Item

A 0 A B C D  
0 Item  
1  
2  
3  
4  
5

Exhibit 3. Label Identified.

F)+B1\*C1/100

D	1	A	B	C	D
0	Item	Pct by wt	Cost/lb	Cost/can	
1	Peanuts	60	0.338	0.203	
2	Pecans			0.000	
3	Cashews			0.000	
4	Almonds			0.000	
5	Total				

Exhibit 8. Replication Completed.

L>Total

A 5 A B C D  
0 Item  
1 Peanuts  
2 Pecans  
3 Cashews  
4 Almonds  
5 Total

Exhibit 4. Label Input Complete.

F) @SUM(B1..B4)

B	5	A	B	C	D
0	Item		Pct by wt	Cost/lb	Cost/can
1	Peanuts		60	0.338	0.203
2	Pecans		10		0.000
3	Cashews		5		0.000
4	Almonds		25		0.000
5	Total		100		0.203

Exhibit 9. Sum of Percent by Weight.

V>60

B 1 A B C D  
0 Item  
1 Peanuts  
2 Pecans  
3 Cashews  
4 Almonds  
5 Total

Exhibit 5. Value Input.

C

5	A	B	C	D
0	Item	Pct by wt	Cost/lb	Cost/can
1	Peanuts	60	0.338	0.203
2	Pecans	10	1.850	0.185
3	Cashews	5	2.437	0.122
4	Almonds	25	1.024	0.256
5	Total	100		0.766

Exhibit 10. Spread After 1C.



# NEW

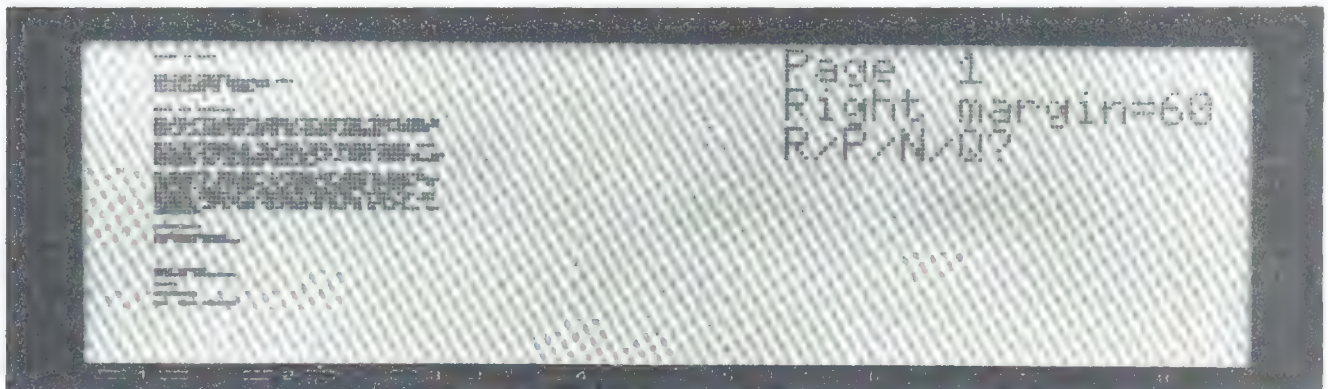
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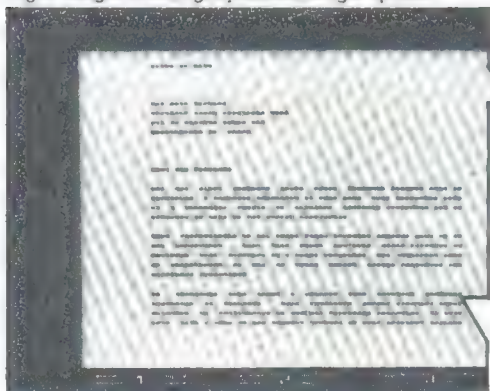
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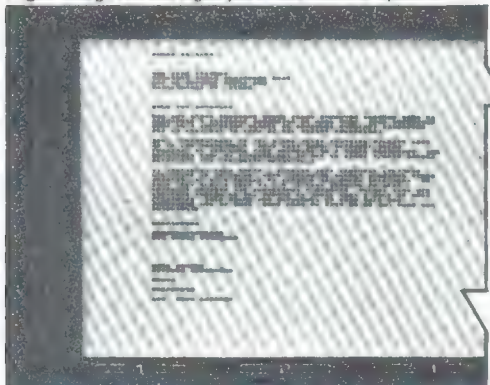
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Right margin at 60, ragged right, single spaced

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- Boldface and underline

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Portable 100/December 1984 **43**



```

2 MAX FILES =1
: CLEAR 3037
: DEFINT A-Z
: DEFSTRS
: CM=19
: RM=20
: SU="S"
: GOSUB 800
: GOSUB 770
: GOSUB 90
: GOTO 70
4 IF T(I,J)>0 THEN VI=VAL(S(I,J))
ELSE VI=0
: IF T(I,J)<0 THEN ST=S(I,J)
: SC="+"
: L=1
: N=0
: GOSUB 8
6 V(I,J)=VI
: RETURN

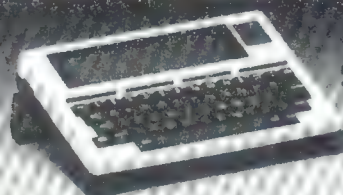
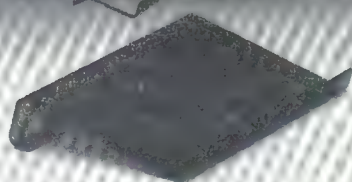
8 GOSUB 44
: IF Q THEN RETURN
ELSE IF SL="(" THEN W=0
: GOSUB 28
ELSE IF INSTR(SN,SL) THEN SC=SL
: GOTO 8
ELSE A=ASC(SL)
: IF A>=65 AND A<=90 THEN X=
VAL(MID$(SL,2))
: V=V(X,A-65)
: T=T(X,A-65)
ELSE IF A=64 THEN GOSUB 16
ELSE V=VAL(SL)
10 A=INSTR(SN,SC)
: IF A<2 OR A=6 THEN VI=VI+V
ELSE IF A=2 THEN VI=VI-V
ELSE IF A=3 THEN VI=VI*V
ELSE IF A=4 THEN VI=VI/V
ELSE IF A=5 THEN VI=VI^V
ELSE IF A=7 THEN VY=VI
: VZ=V
12 GOTO 8
16 W=INSTR("@ABS @INT @SQRT
@ROUND @SUM @AVG @COUNT @EXP
@LN @SIN @COS @TAN
@ATAN @FIX @MIN @MAX @MOD
@< @<= @> @>= @=
@<> @PI @TYP ",SL+" ")
18 IF W=0 THEN GOSUB 920
: RETURN
ELSE W=W/7+1
: GOSUB 28
: IF W>4 AND W<8 THEN RETURN
ELSE IF W=1 THEN V=ABS(V)
ELSE IF W=2 THEN V=INT(V)
ELSE IF W=3 THEN V=SQR(V)
20 IF W=4 THEN VI=SGN(VI)*(
INT(ABS(VI)*10^V+.5))/10^V
: V=1
ELSE IF W=8 THEN V=EXP(V)
ELSE IF W=9 THEN V=LOG(V)
ELSE IF W=10 THEN V=SIN(V)
ELSE IF W=11 THEN V=COS(V)
ELSE IF W=12 THEN V=TAN(V)
22 IF W=13 THEN V=ATN(V)
ELSE IF W=14 THEN V=FIX(V)
ELSE IF W=15 THEN IF VY<VZ THEN
V=VY
ELSE V=VZ
ELSE IF W=16 THEN IF VY>VZ THEN
V=VY
ELSE V=VZ
24 IF W=17 THEN V=VY MOD VZ
ELSE IF W=18 THEN V=- (VY<VZ)
ELSE IF W=19 THEN V=- (VY<=VZ)
ELSE IF W=20 THEN V=- (VY>VZ)
ELSE IF W=21 THEN V=- (VY>=VZ)
ELSE IF W=22 THEN V=- (VY=VZ)
ELSE IF W=23 THEN V=- (VY<>VZ)
ELSE IF W=24 THEN V=3.1415926536
ELSE IF W=25 THEN V=- (T<>0)
26 RETURN
28 SO(N)=SC
: SC=SL
: VS(N)=VI
: W(N)=W
: N=N+1
: VI=0
: IF W>4 AND W<8 THEN GOSUB 32
ELSE L=L-(W>0)
: GOSUB 8
30 N=N-1
: V=VI
: W=W(N)
: VI=VS(N)
: SC=SO(N)
: RETURN

```

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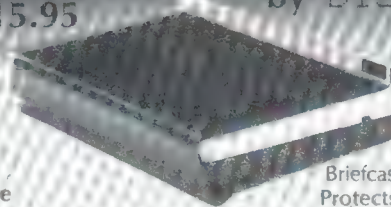
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```

32 GOSUB 40
   : CA=CB
   : RA=RB
   : GOSUB 40
   : L=L+1
   : VI=0
   : X=0
   : IF CA=CB THEN 34
   ELSE IF RA=RB THEN 36
   ELSE GOSUB 925
   : GOTO 38
34 FOR RI=RA TO RB
   : VI=VI+V(RI,CA)
   : X=X-(T(RI,CA)<>0)
   : NEXT
   : GOTO 38
36 FOR CI=CA TO CB
   : VI=VI+V(RA,CI)
   : X=X-(T(RA,CI)<>0)
   : NEXT
38 IF X=0 OR W=5 THEN RETURN
   ELSE IF W=6 THEN VI=VI/X
   : RETURN
   ELSE VI=X
   : RETURN
40 L=L+1
   : GOSUB 44
42 CB=ASC(SL)-65
   : RB=VAL(MID$(SL,2))
   : RETURN
44 Q=L>LEN(ST)
   : IF Q THEN RETURN
   ELSE SL=MID$(ST,L,1)
   : L=L+1
   : Q=(SL="")
   : IF Q OR INSTR(SN,SL) THEN
   RETURN
46 IF L>LEN(ST) THEN RETURN
   ELSE S=MID$(ST,L,1)
   : IF INSTR(SN,S) OR S=") THEN
   RETURN
   ELSE L=L+1
   : IF S="," THEN RETURN
   ELSE SL=SL+S
   : GOTO 46
48 GOSUB 76
50 PRINT SHCHR$(I-R1+34)CHR
   $(9*(J-C1)+35);
   : GOSUB 52

```

```

   : IF P<0 THEN PRINT SR(X)USING
   SE;S(I,J),SM;
   : RETURN
   ELSE PRINT SR(X)USING SE;V(I,J),
   SM;
   : RETURN
52 P=ABS(T(I,J))-1
   : IF P>=0 THEN IF (ABS(V(I,
   J))>99999999/(10^(P+1+(P=0))))
   OR (P=8) THEN MID$(SE,1)=
   "#####\\"
   ELSE MID$(SE,1)="#####\\"
   : IF P THEN MID$(SE,9-P,1)="."
54 RETURN
58 IF H THEN GOSUB 260
   : RETURN
   ELSE PRINT SI"Ln>";S;
   : ST=S
   : GOTO 60
59 ST=""
60 GOSUB 61
   : IF K THEN RETURN
   ELSE IF A=27 THEN ST=""
   : RETURN
   ELSE IF A=8 THEN IF LEN(ST) THEN
   PRINT S" ";S;
   : ST=MID$(ST,1,LEN(ST)-1)
   : GOTO 60
   ELSE RETURN
   ELSE IF A=127 OR A<32 OR A=34
   THEN 60
   ELSE ST=ST+S
   : PRINT S;
   : GOTO 60
61 S=INPUT$(1)
   : A=ASC(S)
   : K=INSTR(SA,S)
   : IF K OR U=0 THEN RETURN
   ELSE IF A>=97 AND A<=122 THEN A=
   A-32
   : S=CHR$(A)
   : RETURN
   ELSE RETURN
64 T(R,C)=0
   : S(R,C)=" "
   : V(R,C)=0
   : RETURN
66 GL=GL-(J-CL)*(CL<J)
   : RL=RL-(I-RL)*(RL<I)

```

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```

: RETURN
69 GOSUB 100
70 U=0
: H=0
: Z=0
: GOSUB 61
: IF K=1 THEN GOSUB 76
: IF T(I,J)=0 THEN 70
ELSE GOSUB 4
: GOTO 69
ELSE IF K=0 THEN ON INSTR("/!>#",
S)+1 GOSUB 110,200,210,230,240
: IF K<2 THEN 69
72 X=0
: GOSUB 48
: C=C-(K=2)+(K=3)-(K=6)*((C=
C1)*(C2+1)+(C<>C1)*(C-C1)+(K=
7)*((C=C1+C2)*(C2+1)-(C
<>C1+C2)*(C-C1-C2)))+(K=10)*C-(K=
11)*(C1-C)
74 R=R+(K=4)-(K=5)-(K=8)*((R=
R1)*(R2+1)+(R<>R1)*(R-R1)))+(K=
9)*((R=R1+R2)*(R2+1)-(R
<>R1+R2)*(R-R1-R2)))+(K=12)*R-(K=
13)*(R1-R)
: GOSUB 90
: GOTO 70
76 T=R
: J=C
: RETURN
80 PRINT SJ;SO;SH"! wm3";
: FOR I=C1 TO C1+C2
: PRINT USING SR+"! "+SM;
CHR$(65+I);
: NEXT
: PRINT
: X=0
: FOR I=R1 TO R1+R2
: PRINT USING SR+"####"+SM;I;
: FOR J=C1 TO C1+C2
: IF S(I,J)>" " THEN GOSUB 50
82 NEXT
: IF L<R1+R2 THEN PRINT
84 NEXT
: RETURN
88 PRINT SH"! "CHR$(J+65)MI
DS(STR$(L),1-(I>9)-(I>99))
: RETURN
90 B=0

```

```

: IF R<0 OR R>RM OR C<0 OR C>CM
THEN BEEP
: R=-R*(R>=0 AND R<=RM)-RM*(R>RM)
: C=-C*(C>=0 AND C<=CM)-CM*(C>CM)
92 GOSUB 76
: GOSUB 66
: IF R-R1>R2 THEN R1=R-R2
: B=1
ELSE IF R-R1<0 THEN R1=R
: B=1
94 IF C-C1>C2 THEN C1=C-C2
: B=1
ELSE IF C-C1<0 THEN C1=C
: B=1
96 S=""
: IF B THEN GOSUB 80
100 X=1
: GOSUB 48
102 GOSUB 76
: GOSUB 88
: PRINT SI"! ";
: IF LEN(S(R,C)) THEN PRINT
CHR$(70-6*(T(R,C)=0)-16*(T(R,
C)>0))>"S(R,C);
104 PRINT SH" #";
: RETURN
110 IF INSTR("1234567890.+-(@",S)
THEN 130
ELSE IF A>31 AND A<>127 THEN 120
ELSE RETURN
118 S=""
: Z=C+1
120 U=0
: IF A=34 THEN S=""
122 GOSUB 58
: IF ST="" THEN RETURN
ELSE GOSUB 64
: IF Z=0 THEN S(R,C)=ST
: RETURN
ELSE FOR X=1 TO LEN(ST) STEP 9
: S(R,C)=MID$(ST,X,9)
: C=C+1
: IF C>CM THEN X=LEN(ST)
: BEEP
124 NEXT
: C=C-1
: GOSUB 76
: GOSUB 66
: C=Z-1

```

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```

: GOSUB 80
: RETURN
130 U=1
: GOSUB 58
: IF ST="" THEN S=ST
: RETURN
ELSE GOSUB 76
: S(I,J)=ST
: T=ABS(T(I,J))
: IF T=0 THEN T=G
132 FOR X=1 TO LEN(ST)
: A=ASC(MID$(ST,X))
: IF (A<48+6*(X=1) OR A>57) AND
A<>46 THEN T=-T
: X=256
134 NEXT
: T(I,J)=T
: GOSUB 4
: RETURN
200 CLOSE
: PRINT SI"Cmd: Hd Ed In De Re
Bl Em Gl Pr St Me ";
: U=1
: E=0
: GOSUB 61
: ON INSTR("HEIDRBFQPSM"
S)+1 GOSUB 780,118,250,300,310,
600,760,500,550,700,400,770
: RETURN
210 PRINT SJ"SQ(0)SB;
: IF 0 THEN FOR I=0 TO RL
: FOR J=0 TO CL
ELSE FOR J=0 TO CL
: FOR I=0 TO RL
215 IF T(I,J) THEN GOSUB 88
: GOSUB 4
220 NEXT
: NEXT
: GOTO 765
230 PRINT SI"GOTO: ";
: U=1
: GOSUB 59
: IF LEN(ST)<2 THEN 780
ELSE X=0
: GOSUB 48
: C=ASC(ST)-65
: R=VAL(MID$(ST,2))
: GOSUB 90
: GOTO 785
240 IF T(R,C)=0 THEN 780
ELSE S(R,C)=MID$(STR$(V(R,C)),
1-(V(R,C)>=0))
: T(R,C)=ABS(T(R,C))
: GOTO 785
250 H=1
: ST=S(R,C)
: IF T(R,C) THEN GOSUB 130
ELSE GOSUB 120
255 GOTO 785
260 SX=ST
: H=LEN(SX)
265 H=H-(H<0)+(H>LEN(SX))
: PRINT SI"Ed>"SX;
: PRINT SH"CHR$(H+35);
: GOSUB 61
: IF K=1 THEN ST=SX
: RETURN
270 IF K THEN H=H+(K=3)-(K=2)+H*(K=
10)-(LEN(SX)-H)*(K=11)
: GOTO 265
ELSE IF A>31 AND A<>127 AND
A<>34 THEN SX=LEFT$(SX,
H)+S+MID$(SX,H+1)
: H=H+1
: GOTO 265
ELSE IF A=27 THEN ST=""
: RETURN
275 IF A=8 THEN SX=LEFT$(SX,H-1-(H=
0))+MID$(SX,H+1)
: H=H-1
ELSE IF A=127 THEN SX=LEFT$(SX,
H)+MID$(SX,H+2)
280 GOTO 265
300 ST="Insert"
: GOSUB 340
: IF A=0 THEN 780
ELSE IF A=67 THEN IF CL=CM THEN
780
ELSE Z=1
: FOR Y=CL+1 TO C+1 STEP -1
: CW=Y-1
: GOSUB 345
: NEXT
: Y=R
: GOSUB 320
: R=Y
: GOTO 355
305 IF RL=RM THEN 780

```

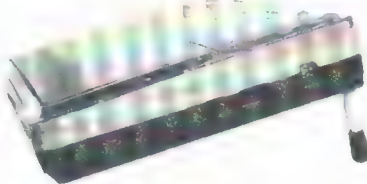
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```

ELSE Z=2
: FOR Y=RL+1 TO R+1 STEP -1
: RW=Y-1
: GOSUB 345
: NEXT
: Y=C
: GOSUB 335
: C=Y
: GOTO 355
310 ST="Delete"
: GOSUB 340
: IF A=0 THEN 780
ELSE IF A=82 THEN 325
ELSE Z=1
: IF C<CL THEN FOR Y=C TO CL-1
: CW=Y+1
: GOSUB 345
: NEXT
315 CT=C
: RT=R
: C=CL
: GOSUB 320
: CL=CL-1
: C=CT+(CT>0)
: R=RT
: GOTO 355
320 FOR R=0 TO RL
: GOSUB 64
: NEXT
: RETURN
325 Z=2
: IF R<RL THEN FOR Y=R TO RL-1

```

```

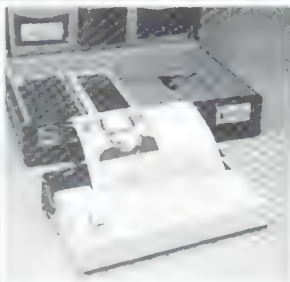
: RW=Y+1
: GOSUB 345
: NEXT
330 CT=C
: RT=R
: R=RL
: GOSUB 335
: RL=RL+1
: C=CT
: R=RT+(RT>0)
: GOTO 355
335 FOR C=0 TO CL
: GOSUB 64
: NEXT
: RETURN
340 PRINT SI;ST"; Col Row ";
: GOSUB 61
: PRINT S;
: IF A=67 OR A=82 THEN RETURN
ELSE A=0
: RETURN
345 IF Z=1 THEN RW=0
: RX=RL
: RY=0
: CX=CW
: CY=Y
ELSE CW=0
: CX=CL
: CY=0
: RX=RW
: RY=Y
350 CZ=CY

```

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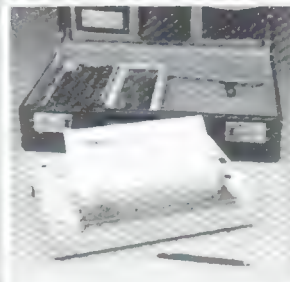
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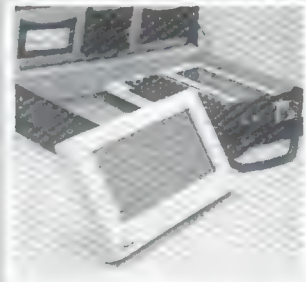
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```

: RZ=RY
: GOSUB 610
: RETURN
355 Z=0
: GOTO 210
400 Z=0
: PRINT SI"Store: # L S Q C ";
: GOSUB 61
: ON INSTR("#LSQC",S)+1 GOTO 780,
405 Z=1
: PRINT SI"Data: L S ";
: GOSUB 61
: IF S="L" THEN 450
ELSE IF S<>"S" THEN 780
410 CLOSE
: PRINT SI"Save File:";
: GOSUB 59
: IF ST="" THEN 780
ELSE SV=ST
: IF Z=0 THEN RA=0
: RB=RL
: CA=0
: CB=CL
: GOTO 415
ELSE GOSUB 715
: IF ST="" OR CB<C OR RB<R THEN
780
ELSE CA=C
: RA=R
415 OPEN SV FOR OUTPUT AS 1
: IF Z THEN PRINT #1,"-1 -1 0 0"

```

```

: RO=R
: CO=C
ELSE PRINT #1,RL;CL;G;0
: RO=0
: CO=0
420 FOR I=RA TO RB
: FOR J=CA TO CB
: IF LEN(S(I,J))=0 THEN 430
ELSE T=T(I,J)
: IF Z THEN T=ABS(T)
: V=V(I,J)
425 PRINT #1,MID$(STR$(I-RO),2);J-CO;
MID$(STR$(T),1-(T>0))" ";
: IF Z AND T>0 THEN PRINT #1;
MID$(STR$(V),1-(V>0))
ELSE IF T<1 THEN PRINT #1,
CHR$(34)S(I,J)CHR$(34)
ELSE PRINT #1,S(I,J)
430 GOSUB 88
: NEXT
: NEXT
: PRINT #1,"-1 -1 0 0" END"SZ
: CLOSE
: GOSUB 102
: GOTO 785
450 CLOSE
: PRINT SH"! Ram:"SO
: FILES
: IF R2>5 THEN PRINT "Disk:"
: LFILES
455 PRINT SI"Load File:";
: GOSUB 59

```

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## SPREAD

```

: IF ST="" THEN 765
ELSE PRINT SH":SO;
: OPEN ST FOR INPUT AS I
: INPUT #1,I,J,RB,CB
: IF Z THEN IF I=-1 THEN RO=R
: CO=C
: GOTO 480
ELSE 470
460 IF I<0 OR RB<1 OR RB>9 OR CB<0 OR
CB>1 THEN 470
ELSE G=RB
: O=CB
: IF I<=RM AND J<=CM THEN RL=O
: RO=O
: CL=O
: CO=O
: GOTO 480
465 PRINT "CHR$(J+65)I" too big";
: GOSUB 955
: IF 2 THEN 495
ELSE RUN
470 GOSUB 615
: GOTO 450
480 IF EOF(1) THEN 495
ELSE INPUT #1,I,J,T,S
: IF I<0 THEN 495
ELSE I=I+RO
: J=J+CO
: T(I,J)=T
: S(I,J)=S
: GOSUB 66
: GOSUB 88
: GOTO 480
495 CLOSE
: IF Z=0 THEN R=O
: C=O
: R1=O
: C1=O
: GOTO 210
ELSE 210
500 IF T(R,C) THEN GOSUB 560
: T(R,C)=SGN(T(R,C))*A
: GOTO 785
ELSE 780
550 PRINT SI"Global: O F W ";
: GOSUB 61
: IF S="O" THEN PRINT SI"Recalc
Order: R C ";
: GOSUB 61
: Z=INSTR("CR",S)
: IF Z THEN O=Z-1
ELSE 780
ELSE IF S="F" THEN GOSUB 560
: G=A
ELSE IF S<>"W" OR R2=5 THEN 780
ELSE C2=3-(C2=3)*(4+(7-
CM)*(CM<7))
: WIDTH 40-40*(C2>3)
: GOSUB 80
555 GOTO 785
560 PRINT SI"Format: Decimal 0-7 or S
";
: GOSUB 61
: A=A-47+27*(A=83)

```



```

: IF A<1 OR A>9 THEN A=G
: GOTO 780
ELSE RETURN
600 Z=0
: SL=CHR$(C+65)+MID$(STR$(R),2)
: CO=C
: RO=R
: PRINT SI"Source:";
: GOSUB 685
: IF E THEN 615
ELSE CW=CO
: RW=RO
: GOSUB 680
: CX=CO
: RX=RO
: IF E OR (CW<>CX AND RW<>RX) OR
RW>RX OR CW>CX THEN 615
605 SL=""
: PRINT " Target:";
: GOSUB 685
: IF ST="" OR E THEN 615
ELSE CY=CO
: RY=RO
: GOSUB 680
: CZ=CO
: RZ=RO
610 IF E OR (CY<>CZ AND RY<>RZ) OR
CZ>CM OR RZ>RM OR CY>CZ OR RY>RZ
OR CZ>CM OR RZ>RM THEN 615
ELSE RT=RY
: CT=CY
: GOTO 620
615 IF A=27 THEN 780
ELSE PRINT "<illegal>";
: GOTO 775
620 IF RW=RX THEN FOR CW=CM TO CX
: IF CT=CZ THEN 625
ELSE 630
ELSE FOR RW=RW TO RX
: IF RT=RZ THEN 630
625 SD=""
: FOR RY=RT TO RZ
: GOSUB 635
: IF E THEN 695
ELSE NEXT
: CY=CY+1
: NEXT
: GOTO 695
630 SD=""
: FOR CY=CT TO CZ
: GOSUB 635
: IF E THEN 695
ELSE NEXT
: RY=RY+1
: NEXT
: GOTO 695
635 D=0
: E=0
: J=CY
: I=RY
: GOSUB 88
: IF T(RW,CW)<0 THEN GOSUB 645
: S(I,J)=ST
ELSE S(I,J)=S(RW,CW)

```

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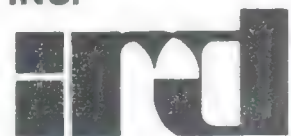
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## SPREAD

```

640 T(I,J)=T(RW,CW)
    : V(I,J)=0
    : GOSUB 66
    : IF Z OR T(I,J)=0 THEN RETURN
    ELSE GOSUB 4
    : RETURN
645 ST=S(RW,CW)
    : L=1
    : SX=""
650 CO=CW-CW
    : RO=RY-RW
    : GOSUB 44
    : CI=ASC(SL)
    : IF CI<65 OR CI>90 THEN 675
    ELSE RI=VAL(MID$(SL,2))
655 IF (Z=1 AND (CI-65)<C) THEN CO=0
    ELSE IF (Z=2 AND RI<R) THEN RO=0
660 IF Z THEN 670
    ELSE D=D+1
    : IF D>LEN(SD) THEN PRINT
    SILEFT$(ST,L-1)"<rep R N";
    : GOSUB 61
    : SD=SD+S
    ELSE S=MID$(SD,D,1)
665 IF S<>"R" THEN 675
670 CI=CI+CO
    : RI=RI+RO
    : IF CI<65 OR RI<0 THEN SL="err"
    ELSE SL=CHR$(CI)+MID$(STR$(RI),2)
675 SX=SX+SL
    : IF L<=LEN(ST) THEN 650
    ELSE ST=SX
    : RETURN
680 PRINT "...";
685 PRINT $LSTRING$(LEN(SL),8);
    : GOSUB 59
    : IF ST="" THEN PRINT SL;
    ELSE CO=ASC(ST)-65
    : RO=VAL(MID$(ST,2))
    : SL=ST
690 E=(LEN(SL)<2)+(CO>CM)+(RO>RM)+(A=
27)
    : RETURN
695 IF Z THEN RETURN
    ELSE 765
700 PRINT SI"Print: Printer, Device ";
    : GOSUB 61
    : IF S="P" THEN SV="LPT:"
    : GOTO 705
    ELSE IF S<>"D" THEN 780
    ELSE PRINT "Spec: ";
    : GOSUB 59
    : IF INSTR(ST,":")=0 OR LEFT$(ST,
4)="RAM:" THEN 780
    ELSE SV=ST
705 GOSUB 715
    : IF ST="" THEN 780
    ELSE OPEN SV FOR OUTPUT AS 1
    : FOR I=R TO RB
    : FOR J=C TO CB
    : GOSUB 52
    : IF P<0 THEN PRINT #1,USING SF;
    S(I,J);

```



```

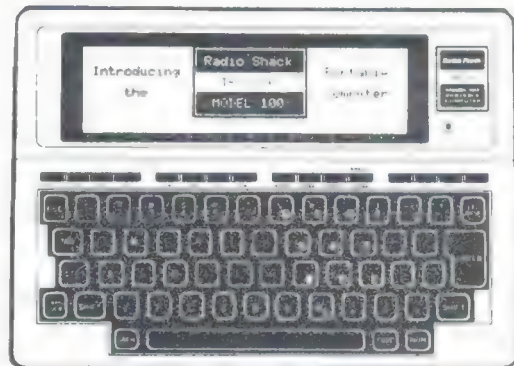
ELSE PRINT #1, USING SE; V(I, J);
710 GOSUB 88
: NEXT
: PRINT #1, ""
: NEXT
: PRINT #1, SZ;
: CLOSE
: GOTO 785
715 PRINT SI; "Lower right ";
: GOSUB 59
: IF ST="" THEN RETURN
ELSE SL=ST
: GOSUB 42
: RETURN
750 S="Quit: ";
: GOSUB 790
: IF S="Y" THEN CLS
: SCREEN 0
: MENU
ELSE 780
755 S="Clear: ";
: GOSUB 790
: IF S="Y" THEN RUN
ELSE 780
760 PRINT SI; "Blank ";
: GOSUB 61
: IF K THEN GOSUB 64
: GOTO 785
ELSE 780
765 GOSUB 80
: GOTO 780
770 GOSUB 80
: GOSUB 795
: PRINT USING "f=#: o=!#####m";
####s"; G-1, SQ(O), FRE(O), FRE(S);
775 BEEP
: FOR X=1 TO 4000
: NEXT
780 BEEP
785 S=""
: RETURN
790 PRINT SI; S" Confirm=Y Abort=";
: GOSUB 955
: RETURN
795 PRINT SI USING "spr cm=! rm=### p=";
CHR$(CM+65), RM, SU;
: RETURN
800 C2=3
: R2=5
: W=(CM+1)*RM
: FOR U=1 TO 13
: SA=SA+CHR$(ASC(MID$("5DEFG".
<*9: ?B", U))-40)
: NEXT
805 CLS
: U=1
: RM=W/(CM+1)
: GOSUB 795
: PRINT "<ENTER or new cm?";
: GOSUB 61
: IF K THEN IF SU="S" THEN
DEFNGV
ELSE DEFDBLV

```

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Circle No. 57 on Reader Service Card

## SPREAD

```

ELSE IF A<68 OR A>90 THEN BEEP
: GOTO 805
ELSE CM=A-65
: PRINT
: PRINT "precision: Sord p="
: GOSUB 61
: SU=CHR$(83+15*(A-68))
: GOTO 805
810 ON ERROR GOTO 900
SCREEN 1
: WIDTH 40
: R2=(-21*(RM>=21))-(RM*(RM<21))
815 CLS
: ON ERROR GOTO 910
: DIM I,J,V1,L,ST,SC,N,Q,SL,T,X,
V,VY,VZ,CA,CB,RA,RB,CI,RI,CL,RL,
O,B,P,T(RM,CM),S(RM,CM),V(RM,CM),
VS(10),SO(10),W(10),SR(1),SQ(1)
: SN="+-*/^(,,"
: SZ=CHR$(26)
: SQ(1)="R"
: SQ(0)="C"
820 S=CHR$(27)
: SR=S+"p"
: SR(1)=SR
: SM=S+"q"
: SB=S+"k"
: SH=S+"y"
: SJ=SH+" "
: SI=SJ+SB
: SO=S+"J"
: G=1
: SF="\ \\\\"
: SE=SF
: RETURN
900 RESUME 815
910 E=ERR
: IF E=7 THEN ON ERROR GOTO 0
ELSE IF ERL =415 THEN RESUME 615
ELSE IF ERL =455 THEN RESUME 470
ELSE IF ERL =480 AND ERR =9 THEN
RESUME 465
ELSE IF ERL >2 AND ERL <48 THEN
GOSUB 920
ELSE GOSUB 950
915 IF ERL >46 THEN RESUME 780
ELSE PRINT SI,ST,SJ;
: RESUME 69
920 IF L<1 THEN 950
ELSE ST=LEFT$(ST,L-1)
: R=I
: C=J
: V(I,J)=0
: GOSUB 90
925 PRINT SI,ST"<calc error";
: GOTO 955
950 PRINT SI"M100 Error"ERR " at
line"ERL ;
955 BEEP
: PRINT " <ENT>";
: GOSUB 61
: RETURN

```



# REVIEWS



## WORDSTAR COMMANDS SET THIS T.F. OFF FROM REST

### *The Journalist*

American Micro Products  
705 North Bowser  
Richardson, TX 75081  
214-238-1815  
\$99.95

By BOB RYDEEN

**M**any so-called word-processing programs available for lap computers are nothing more than proprietary-command text formatters that coincidentally work with the computer's built-in text program. While acceptable for most purposes, the practice prohibits transferring anything other than ASCII files between computers. This limitation prevents printing documents without reformatting them on the host machine and even, in some cases, forces the tedious task of removing incompatible command codes imbedded in the text.

For those who use their lap computers as an extension of their office network, the problem can be serious. For those who use them as their principal computer, the problem is non-existent. With the text-formatting program *The Journalist*, this problem doesn't exist in either case. Its use of the popular WordStar command structure allows ASCII and format-command transfers to host machines without having to reformat before printing.

**SVELTE SIMPLICITY.** The program uses only the most popular features found in WordStar, such as mail-merge, margin-footer-header control, pagination, left or left-right justification, and page-length control in a useful and varied list. Because of this, it doesn't get loaded down with a com-

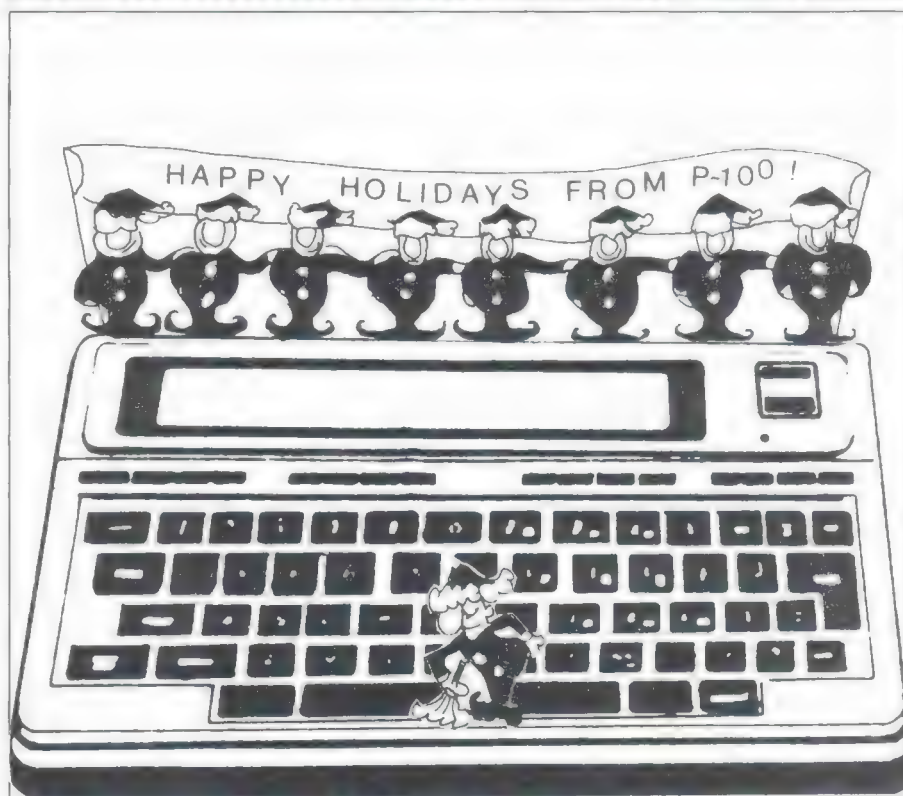
### NOTES FROM ANOTHER USER OF TEXT POWER AND THE AMPI JOURNALIST

**M**achine-language programs like Text Power 100 and The Journalist from American Micro Products pose some problems for the average user of the Model 100. As Peter Stanley said in his review of Text Power, appearing on the Model 100's main menu is the printer-driver, which accesses and runs Text Power. As long as

In two past issues of *Portable 100* (January 1984 and August 1984), Bill Walters explained what's going on in the 100's high memory where machine-language programs reside and how to maintain more than one machine-language program in your machine simultaneously. I've used his tips to handle Text Power and The Journalist.

When you load Text Power from typing SAVEM "TP100.CO", 60416, tape, the first program into your machine is a Basic program. It loads automatically two machine-language programs from tape: a printer driver (in my case, a 134-byte machine-language program) and Text Power. Capitalizing on the techniques described by Bill Walters in his August column, when not using Text Power, I store it in RAM by entering Basic and typing SAVEM "TP100.CO", 60416. Then I clean out high memory with CLEAR 256, MAXRAM.

*continued on page 63*





## MODEL 100 CASINO VIDEO POKER GAME



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mand structure so complex it inhibits casual use.

It's powerful enough to replace a bigger system for everything but the more demanding and esoteric word-processing needs, yet simple enough to allow an infrequent user to feel completely comfortable with it, whether they are WordStar literate or not. The only difference between the NEC and Radio Shack versions are NEC's doesn't support underscore and bold printing.

The Journalist features the ability to edit within its program, with or without control characters, or recall, format, and print a pre-written document file.

**PLOT FUNCTION.** Additionally, through use of its plot function, the 8-by-40 liquid crystal display shows a near-exact miniature of a finished letter or document. Plotting indicates page breaks and letter size, not to mention the ability to try different line widths. By the time you're ready to print you have a near-exact image of what your finished letter will look like.

The term near-exact means just that; the picture it creates drops one line at the top and one line at the bottom of each page and, as the picture is made up of a series of dots, it isn't clear enough to differentiate between actual words or, in the case of a desired page break, sentences. It is, however, far more than the toy my description makes it appear.

After you design your document by using the plot feature, you can print directly from that function. In the case of multiple pages using, for example, stationary with different size letterheads on the first and second sheets, this feature allows you to print the first page, note where it ends on the printed page, and then insert command codes for the new parameters before going back to the plot function and printing the second page.

**PERSONALIZED.** It sounds complex, but it's actually a great way to overcome the limitation of not being able to screen a complete document as is possible with most full size computers. For documents using a uniform format, the normal print functions are excellent, with all the features necessary to design a format to your specific needs, and then print the number of copies that you need.

Additionally, you can elect to pause



What would it take to make it a 10? A more competitive price. Until that between pages and even decide to print, for example, pages 3 through 5. Like the rest of the program, its error-handling capabilities are easy and complete.

Another excellent feature of the program is the ability to pre-set formats as document files and then insert mail-merge commands into the documents when you write them.

For our corporate letterhead and a 12 characters-per-inch printwheel, I lead my letter with .F1 form12 which contains the protocols necessary to automatically give the commands for a half-inch left and right margin, right justification, no page numbers, a copy start at 15 spaces from the top and 75 lines total text. An .F1 second inserted at the end of the first page corrects for the smaller letterhead on our second sheet.

**MINOR MISTAKES.** Nothing in the world of computers is perfect and The Journalist is no exception. Its problems, however, are small and extremely bearable.

There are a couple of occasions where a C or Q won't bring you the continue or quit that you desire, but they're rare and recoverable. In one instance it only requires a shift C or Q and another can be overcome by turning the computer off and back on. In every case your document is still safe as a document file, so nothing more than your pride is hurt. Still, as good as this program is, the bugs shouldn't exist and hopefully will be remedied by the next revision.

The only other problems are equally mundane: The loading procedure is in an appendix at the end of the manual. This could give people who don't take time to read instructions some trouble.

**EXCELLENT BUT EXPENSIVE.** Last in the list of complaints is the price. At \$99.95 in an environment of \$19.95 to \$59.95 software prices, it's on the expensive side. It's powerful, it's easy, it's fairly compact, and the entire package is done with good marketing in mind ... but it's comparatively expensive.

On a scale of 1 to 10, I'd give it a 7.5; correct the location of the loading procedure in the otherwise excellent instructions and I'd raise it to an 8.

*continued on page 63*

## NAVIGATORS - STUDENTS - STARGAZERS

```
DA 08/25/1985
UT 19:23:41
LA 42°58.6'N
LO 078°20.8'W
FU 100° MA 2.1
ID Polaris
AZ 359°38.2'T
AL 042°04.8'
```



ASTRO creates a display of the sky, as you look at it from any place on earth, for any date and time. ASTRO quickly computes the apparent positions of 179 celestial bodies including the Sun, Moon, planets, and navigational stars. You identify any star or body simply by moving the cursor onto it; ASTRO shows name, magnitude, azimuth, and altitude. Manual & Cassette for 24K TRS-80/100. *Halley's Comet too!* \$39.95 + \$2.00 shipping; Visa, MasterCard, or check. Loquor Enterprises, 3 Heneage Lane, Hanover, NH 03755

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# TURN YOUR 100 INTO A COMPUTER GRAPHICS TABLET

Unleash your latent artistic abilities with a little help from your friend,  
the Model 100.

**D**oodle turns your Model 100 into an art pad and pencil and if you like what you draw, you can save it. Later, you can add to it or change it; run it forward, backward, or in a pattern; and see it in regular or reverse video.

The entire program takes less than 2050 bytes of RAM. However, running it uses an additional 4000 bytes of RAM. If you try to run it when you have less than 4000 bytes, then the program will stop with an out of memory error.

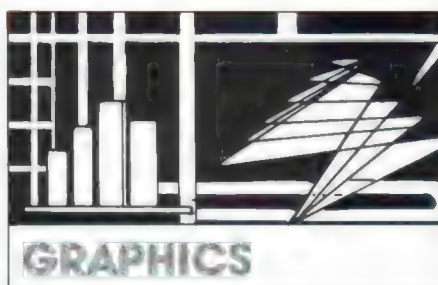
All of Doodle's commands are done with number keys. You *never* need and you should *never* use the function keys.

**INITIAL MENU.** The initial menu has three choices: [1]New, draw a new picture; [2] Load, load a picture you have saved; and [3]Menu, ends the program.

If you elect to new a picture, you will be prompted to give the frame dimensions. The dimensions describe pixels, the smallest divisions of your LCD. You must give dimensions within the stated maximum and minimums. For each, type your desired dimension and hit enter.

You will next be asked to set the point where you want the drawing to begin. Note the point starts near the upper left corner. You move the point with the cursor keys. The point will move in the direction of the cursor key arrows and will not go outside the frame.

Note also that at the outside border of the screen, the location of the pencil point is indicated by showing how far down and how far over it is. Those markers are for convenience in drawing. When the starting point is where you want it, press enter and you will see the drawing screen.



**2000 PIXELS.** Your pencil point may turn on up to 2000 screen pixels. The number you've used is tallied in the upper left corner.

In this mode, pressing number key 1 toggles "set." When set is on, you are moving the pencil point and drawing. When it's off, you are moving the pencil point, and you are *not* drawing. This allows you to draw in different locations and create angles and curves.

You can erase successive pixel points by tapping 2 (erase) while set is on.

You can save your picture by tapping 3. That will clear the screen and prompt you for a new file name for your picture.

**COUNTING PIXELS.** In order to use the least amount of RAM, the program is designed to use only two bytes of

RAM for each pixel point to be saved. The number in the bottom right corner tells you how much RAM is available. That number must be at least twice your pixel count.

Pressing 4 (done) will erase your picture and return you to the menu, but will not save your picture.

If, from the main menu, you elect to load a picture, you will be prompted for the file name. Depending upon the length of the file, the program will take up to a few minutes to load the picture into memory. From there the draw menu gives you four choices.

[4]Rtrn, returns you to the main menu.

[1]Edit will redraw the picture, and leave you in a position to add to or change the picture.

[2]Draw and [3]Rvrs initiates the drawing of the picture in regular or reverse video. Select either and you'll be prompted to select drawing forwards, backwards, or in a pattern.

After the drawing is complete, touch any key, and you return to the draw menu. There you can select a different version of the same picture or start over again.

Good luck and have fun! ◀

```
0 ***** Doodle.pms *
  ***** By: Peter
    M. Stanwyck
      1 Kaiser Plaza
1 '      Oakland, California
  94612 All Rights
    Reserved
3 GOTO 48
4 GOSUB 9
  : GOTO 10
5 Z=INKEY$
  : IF Z="" THEN 5
    ELSE L=32-ASC(Z)
```



# FULL-FEATURE SPREADSHEET

## Application Templates

For Your Radio Shack TRS-80 Model 100/NEC PC-8201A Portable Computers

*AMPI's AmericanCalc Spreadsheet*—designated TPlan for the Radio Shack TRS-80 Model 100, and NPlan for the NEC PC-8201A—is a full-feature spreadsheet program. It has the following features: handles up to a maximum of 90 rows or 26 columns; cursor movement is left, right, up, down, and go to any location; accepts data entries for numbers, labels, and formulas; formulas include addition, subtraction, multiplication, division, power, trigonometric, integer, absolute, natural logarithm, and exponentiation; replicate numbers or formulas; insert or delete rows or columns; copy, save, load, and screen dump; and built-in calculator. The program is shipped with bound instruction manual, pre-recorded audio tape, and vinyl album case.

This popular spreadsheet now has three new templates especially designed for busy people who do not have the time to set up their own spreadsheet applications. Once the TPlan or NPlan is loaded, simply select and load the application template that fits your particular need. The three new templates are:

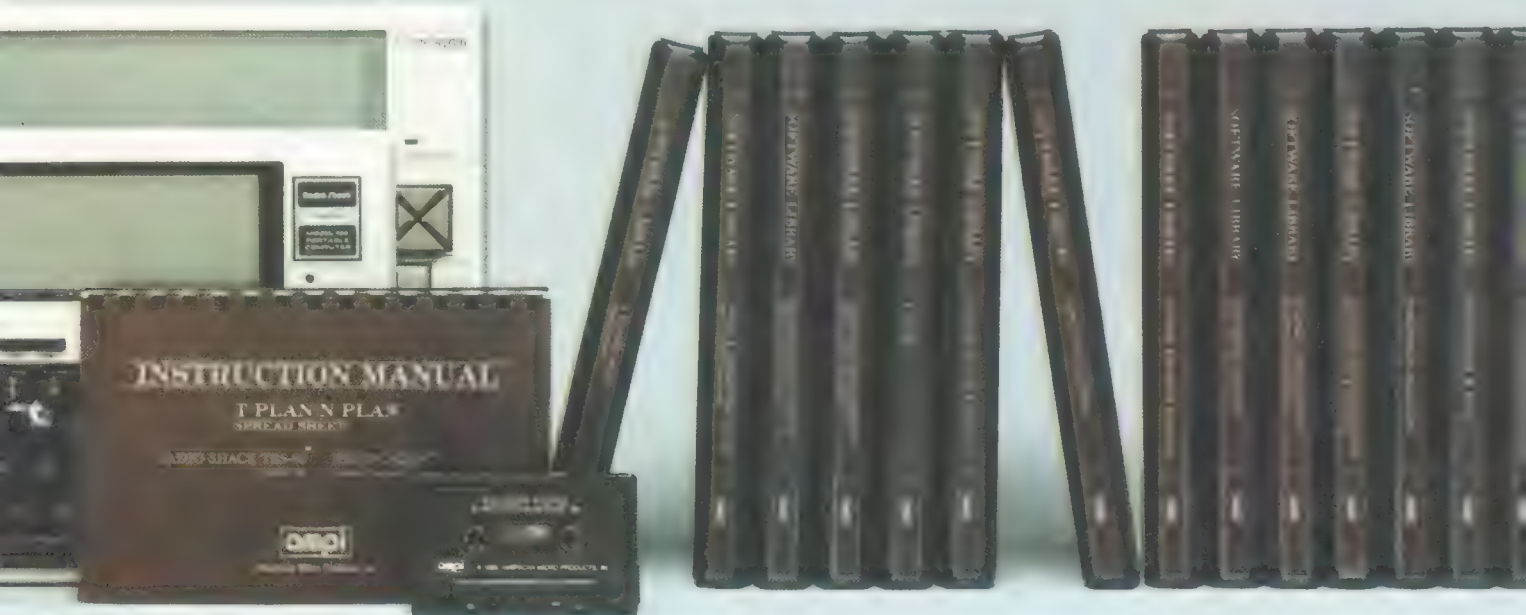
*Financial Management* — Includes T Plan and N Plan application templates for: Stock Portfolio, Home Ownership, Home Budget, Life Insurance Requirement, and Personal Check Register.

*Business Management* — Includes T Plan and N Plan application templates for: Income Statements, Balance Sheets, Business Start-up, Break-even Quantity, and Expense Analysis.

*Sales and Marketing Management* — Includes T Plan and N Plan application templates for: Sales Forecast, Profit Mark Up, Sales Analysis, Project Cost Estimate, and Advertisement Efficiency Measurement.

AMPI also has available several additional new software programs for the Radio Shack TRS-80 Model 100 and NEC PC-8201A. These include: Income Property Analysis, Portfolio Analysis, Curve Fitting, Histogram and Plot, Equation Solver, RPN Calculator, and FORTH.

Write for free catalog listing additional Radio Shack TRS-80 Model 100 and NEC PC-8201A business and engineering programs.



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Portable 100/December 1984 59



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Computer \_\_\_\_\_ Signature \_\_\_\_\_

## TEXT POWER 100

Circle No. 13 on Reader Service Card

### Who says size doesn't count?

From the software ads around here, you might get the impression that your portable computer can store the knowledge of the universe. But it can't. That's why you need to know just how big the software is. Or how small.

Keep this in memory: *Text Power 100™* is 2,500 bytes long. *Elf-writer* (by Ceres Software) is 10,000 bytes long. *Write +* (by Portable Computer Support Group) is 3.5K. The *Traveling Writer™* (by Traveling Software) is 5000 bytes. When our competitors' ads don't tell you how big their programs are, they're trying to tell you something.

Size is just one advantage of our 100 percent machine-language code. The other is speed. *Text Power 100™* formats faster than you can imagine. Faster than all of the competition's products working in parallel. Fast enough to format the Bible in 12 minutes. Right-justified.

*Text Power 100™* features: *Page Plot,™* merge text, edit mode, label printing, page numbering, formatted preview mode, parameter/file memory, right justification, footers, headers, internal format controls, page length, top margin, bottom margin, left margin, right margin, double/single spacing, vertical center, horizontal center, page break display, new page command, full printer customization and more.

*Text Power 100.™* For the Model 100, Olivetti M10 and NEC PC-8201A. \$49.95 plus \$2.00 shipping. Available exclusively from The Covington Group/310 Riverside Drive, Suite 916, New York City, NY 10025/212 678-0064, 864-1700.



```

: RETURN
6 U=A(B)
: GOSUB 14
: PSET (G,H,I)
: RETURN
7 PRINT @40,MID$(STR$(M),2)" "
: RETURN
8 PRINT @120,W
: RETURN
9 PRESET (Q,2)
: PRESET (Q,F+1)
: PSET (G,2)
: PSET (G,F+1)
: RETURN
10 PRESET (34,R)
: PRESET (E+1,R)
: PSET (34,H)
: PSET (E+1,H)
: RETURN
11 K=0
: Q=G
: R=H
: IF L=1 AND H<F-1 THEN H=H+1
ELSE IF L=2 AND H>4 THEN H=H-1
ELSE IF L=3 AND G>36 THEN G=G-1
ELSE IF L=4 AND G<E-1 THEN G=G+1
ELSE BEEP
: K=1
12 IF K=0 AND N=0 THEN M=M+1
: A(M)=100*G+H
13 IF L>2 THEN 9
ELSE 10
14 Q=G
: R=H
: H=U MOD 100
: G=(U-H)/100
: RETURN
15 X="OFF"
: IF N=0 THEN N=1
ELSE N=0
: X=" "
16 RETURN
17 PRINT @12,"DOODLE.pms Menu"
: PRINT @165,"[1]New [2]Load
[3]M100 Menu"
18 GOSUB 5
: IF INSTR("123",Z)=0 THEN 18
ELSE L=VAL(Z)
: ON LGOTO 19,35,49
19 CLS
: PRINT @10,"Frame Size"
20 GOSUB 8
: PRINT @120,"Left-Right 10-200";
: INPUT X
: E=VAL(X)+35
: IF E<45 OR E>235 THEN BEEP
: GOTO 20
21 GOSUB 8
: PRINT @120,"Up-Down 10-50";
: INPUT X
: F=VAL(X)+3
: IF F<13 OR F>53 THEN BEEP
: GOTO 21
ELSE CLS
: LINE (35,3)-(E,F),1,B
22 PRINT @280,"Set Start Point Then

```

```

<EN>";
: G=40
: Q=40
: H=8
: R=8
: GOSUB 4
23 PRESET (Q,R)
: PSET (G,H)
: GOSUB 5
: IF L=19 THEN 24
ELSE
: IF L<1 OR L>4 THEN BEEP
: GOTO 23
ELSE GOSUB 11
: GOTO 23
24 N=0
: M=0
: A(0)=100*G+H
: PRINT @280,G;
25 PRINT @313,FRE(0)-500;
: PRINT @280,"[1]Set [2]Erase
[3]Save [4]Done";
: GOSUB 7
: PSET (G,H)
26 GOSUB 5
: IF INSTR("1234",Z)>0 THEN ON
VAL(Z)GOTO 28,30,32,3
ELSE IF L>4 OR L<1 OR M=V THEN 26
ELSE GOSUB 11
: IF N=0 THEN PSET (G,H)
27 GOSUB 7
: GOTO 26
28 GOSUB 15
: PRINT @242,X
29 GOTO 26
30 IF M=0 THEN 26
ELSE PRESET (G,H)
: U=A(M-1)
: GOSUB 14
: GOSUB 4
31 M=M-1
: GOSUB 7
: GOTO 26
32 CLS
: PRINT @120,"Save File NAME";
: INPUT X
: GOSUB 8
: PRINT "Saving.."X
: OPEN X FOR OUTPUT AS 1
: PRINT #1,E;F
33 FOR A=0 TO M
: U=A(A)
: GOSUB 14
: IF G>125 THEN G=G+2
34 PRINT #1,CHR$(G)CHR$(H+35);
: NEXT
: GOTO 3
35 CLS
: PRINT @120,"File ";
: INPUT X
: CLS
: M=0
: N=0
: OPEN X FOR INPUT AS 1
: INPUT #1,E,F
: G=36

```



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## DOODLE

```

: H=4
: PRINT @120,"Loading.."X
36 FOR M=0 TO V
: IF EOF(1) THEN 38
: ELSE C=ASC(INPUT $(1,1))
: IF C>127 THEN C=C-2
37 A(M)=C*100+ASC(INPUT $(1,1))-35
: NEXT
38 M=M-1
39 S=0
: CLS
: CLOSE
: PRINT @120,"Loaded "X
: PRINT "[1]Edit [2]Draw [3]Rvrs
[4]Rtrn
40 GOSUB 5
: IF INSTR("1234",Z)=0 THEN 40
: ELSE P=VAL(Z)
: IF P=4 THEN 3
: ELSE IF P=1 THEN 42
: ELSE PRINT @160,"[1]Forward
[2]Backward [3]Pattern"
41 GOSUB 5
: IF INSTR("123",Z)=0 THEN 41
: ELSE S=VAL(Z)
42 CLS
: I=1
: IF P<3 THEN LINE (35,3)-(E,F),
1,B
: ELSE LINE (35,3)-(E,F),1,BF
: I=0
43 IF S=3 THEN FOR C=1 TO 10
: FOR B=C TO M STEP 10
: GOSUB 6
: NEXT
: GOTO 46
44 IF P=1 OR S=1 THEN FOR B=0 TO M
: ELSE IF S=2 THEN FOR B=M TO 0
STEP -1
45 GOSUB 6
: NEXT
46 CLOSE
: IF P=1 THEN Q=G
: R=H
: GOSUB 4
: GOTO 25
47 PRINT @280,"";
Z=INPUT $(1);
: GOTO 39
48 CLS
: CLEAR
: DEFINT A-V
: DEFSTR W-Z
: W=SPACE$(39)
: V=2000
: KEY OFF
: DIM A(V)
: ON ERROR GOTO 50
: GOTO 17
49 MENU
50 CLS
: PRINT @120,"File Error.."
: FOR B=1 TO 999
: NEXT
: GOTO 3

```



## REVIEWS

occurs, I only can say that it's an excellent piece of software ... and then

suggest you let your budget decide the purchase. ◀

NOTES *continued from page 55*

When I want to use Text Power again, I run this simple program:

```
10 CLEAR 0,60416
20 LOADM "TP100.CO"
30 KILL "TP100.CO"
50 MENU
```

That program (stored in my machine as "TPLOAD") clears a chunk of memory for Text Power, loads the program into high memory, deletes the RAM version, and returns to the main menu. Then I can enter the program in the normal way — through the printer-driver.

This kind of file manipulation is less important for a compact program like Text Power than it is for a 6.9K program like The Journalist.

A user sticking strictly to the documentation in The Journalist will find the program gobbling twice as much memory as it should. That's because The Journalist's documentation instructs a user to save the program in RAM and in high memory at the same time.

That problem can be corrected with the program in listing 1, JOURLD.BA.

After loading The Journalist as outlined in its documentation, I kill the high memory version with CLEAR 256,MAXRAM.

When I want to use the program, I enter JOURLD.BA. Option 1 loads The Journalist, erases its RAM counterpart, and runs the text formatter.

When I'm finished using The Journalist, I reenter JOURLD. Option 2

stores the AMPI program in RAM. Once that's done, the program falls through to Basic. I clean out high memory (CLEAR 256,MAXRAM) and return to the main menu.

If I intend to use The Journalist intermittently, I let it reside in high memory. I can run it again by entering JOURLD and choosing option 3.

A final note: Bob Rydeen tested The Journalist on a NEC 8201A, so there are a few things Model 100 owners should be aware of when using the program in their machines.

- The program supplies a line feed with its output. If a user doesn't have a Radio Shack printer or hasn't adjusted his or her printer to compensate for the 100's failure to provide a line feed with its output, everything will be fine. Otherwise, a user will have to make the proper adjustment to his or her printer.

- When entering the name of a file for processing, a user must use uppercase letters. If lowercase is used, a "file not found" error will be encountered.

- While AMPI claims control-S will turn on underlining and control-B will turn on bold face, these functions depend on what printer you are using. AMPI's documentation doesn't say which printers these codes work with.

For special printing effects, I recommend following the procedure outlined in the Model 100 manual. Use control-p and the escape sequence outlined in your printer's documentation. ◀

— John P. Mello Jr.

## Program Listing 1. JOURLD.BA

```
10 CLS
   : PRINT @80,"[1] Load AMPI
   Journalist"
   : PRINT @160,"[2] Save AMPI
   Journalist"
   : PRINT @240,"[3] Call AMPI
   Journalist"
20 A$=INKEY$
   : IF A$="" THEN 20
30 B=VAL(A$)
   : ON BGOTO 100,200,130
100 CLEAR 255,56100
110 LOAD M"JOUR.CO"
120 KILL "JOUR.CO"
130 CALL 56100
200 SAVE M"JOUR",56100,62259,56100
```

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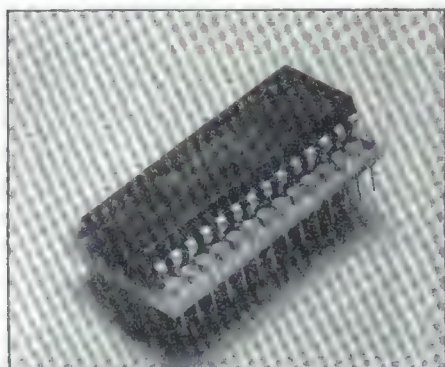
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By PETER M. STANWYCK

**T**ext Power 100 is a \$49.95 text-formatting program for the Model 100. When compared to its Model 100 competitors in the marketplace, it's the clear frontrunner. It reflects a thoughtful, uncommon, and effective balance of user friendly software values.

The program on balance is a print-formatting program which best meets the unique and contradictory conditions imposed by a lap-portable computer. It isn't the program with the most features, and some of its features could be improved. But still, it does what it does do quite well, very fast, and uses only 2507 bytes of RAM.

Unfortunately, the program is marred by nettling flaws and terrible documentation, and lacks some ordinary capabilities you'd expect from a print-formatting program. Too bad because it has some unique and fancy features.

**BYTE COMPROMISE.** Since the program's number one priority was to offer a program no larger than it absolutely had to be, there are tradeoffs. In order to get that, there was a process of weighing the byte overhead of any capability against the user value of that capability. I totally support the priority and the process, but I suspect the weighing scale the program mentors used wasn't one I'd have used.

For example, the program doesn't recognize tabs, and if you inadvertently use them, it'll foul up your formatting. The program excluded it because its authors didn't think the capability was worth the 160 bytes of extra program.

If the program has all the capabilities you need, you can be sure that the performance is reliable, fast, and in the least amount of RAM.



The program achieves its size and speed because it's written in machine language. The 100 isn't very friendly to machine language. If you're an experienced computer user, or are careful not to have more than one machine-language program in RAM at a time, then you should have no problems.

Potentially the problems could cause your computer to cold start. Usually, though, they mean that you'll have to reload the program.

**ESSENTIALS VS EXTRAS.** The program has the most vexatious copyright warnings I've seen. It gives you permission to make only one copy, but refuses to tell you how to do it. It is easy if you're a programmer, and impossible if you aren't, which is a senseless favoritism. At least, users with micro-cassette capability would want to transfer the program so they could have it with them when they travel.

In reviewing any software, I believe it's critical to first analyze the primary functions before the fancy extras. This is especially true when certain functions have been traded in favor of the extras.

**FORMAT CONTROL.** The program has three different ways to control format.

From the main menu the set command reveals a format menu where you can easily select new values for left margin, page length, and top and bottom margins. You also can select right justification, single or double space, and continuous feed or single sheet printing.

The second way occurs prior to printing text when you are asked to select a printing width.

The third way allows dynamic changes in format by installing format commands in your text file. These format commands use the 100's special graphics codes and can be used to set left and right margins; to force a page break; to center a line of text; to make a key phrase appear on a single line; and to install page numbering, headers, and footers.

The set format menu and the width always default to their status as of the last use, and will be changed to reflect

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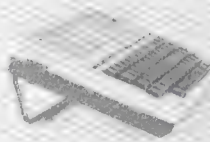
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any new commands encountered in the text file.

**PRINT FLAWS.** The documentation is useless, but if the concepts are familiar, formatting is straightforward and should require little assistance. For those committed to the English language you will find the program a tad bizarre.

For example, page length is defined as the number of lines of text you want on a page, rather than the length of the page. From that, the program claims to deduct the top and bottom margin. The program does it right, it just doesn't explain it right. Your text length is the page length less top and bottom margins.

It does the same hatchet job on width by having it measured from the left edge of the paper rather than the left margin.

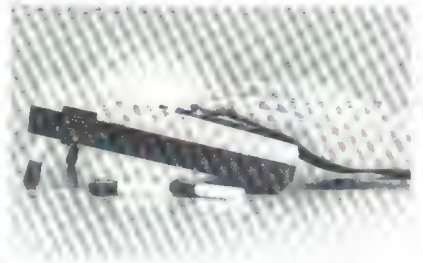
I don't like the use of graphics codes for internal formatting. While they are easy to install and have the advantage of being one byte rather than two, when editing your text, it is not easy to interpret obscure graphic codes. A "c" conveys centering much better than a checkerboard does. Moreover, if you are transferring these documents to another computer, these graphics codes can't be transmitted under most conditions.

Besides not recognizing tabs, the program does not allow more than double spacing. Nor does it allow a change of spacing command. Headers and footers can only be one line and must be five lines away from the body of text. These are the kinds of choices the program made which, in my mind, diminishes its effectiveness as a print formatter.

The program uses the least possible bytes for printer instructions such as underlining or condensed print by utilizing the Model 100's built-in ability to imbed control codes in text and to send those to a printer. It achieves this by selling you a program which is specific to your printer and charging \$10 for each additional printer type you might want to use.

Installing control codes is not particularly easy for users, but the byte savings makes them worth learning. However, I regard printer-specific programs as a disadvantage because

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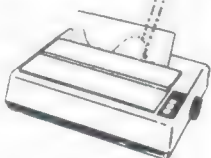


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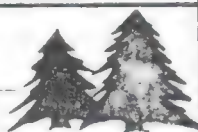
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they inhibit the 100's most important attribute, it's portability.

**NO OVERBYTE.** While it's appropriate to note and criticize the program for what it doesn't do, my predominant reaction is that it handles it's formatting and printing chores quickly and easily — but is just more limited than I think it should be.

In addition to required duties of a print formatter the program volunteers to do some extras. I am not sure how useful some of them are, but what makes the program a truly extraordinary piece of software is that it does them, and everything else, still within the 2500 bytes.

There is a merge capability, which isn't well-explained nor easy to operate, but nonetheless provides an effective means to merge information from one file into the blanks of another document.

The program can directly access the text editor of the Model 100 without exiting the program, and it has the ability to vertically center text on a page, such as you might need to do for a short letter. It will display pages of text, or simply display page breaks. It even has the ability to plot each page of text on the Model 100 screen in order to give you a preview of the page format.

However useful these functions are is largely a function of personal taste. Personally, I would have preferred greater capability in the routine formatting capability.

**DEFAULT FAULT.** One aspect of the program that ticks me is the the default status of all the commands changes to reflect whatever commands were in the last file you printed. Even the name of that file becomes a default value for the next printing. Whatever unique changes are required by a particular document should be limited to that document and should not require you to reset the default values. Default values should be utilized when special values are not required.

In sum I recommend the program because of its price, capability, size, speed, ease-of-use ratio. It could be a stronger program, though. And as far as the documentation is concerned, they should throw it out and start over. ◀

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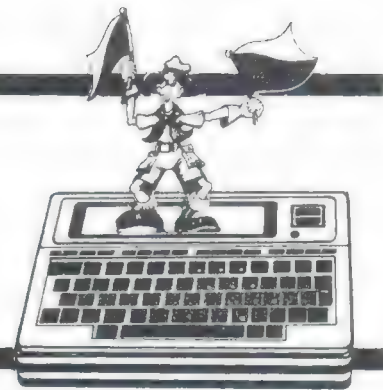
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# USER GROUPS

EDITED BY NANCY LAITE



**A**s any *Portable 100* reader knows, the Model 100 is being used all over the world for a myriad of jobs. And wherever there's a 100, there's usually two or three and the next thing you know, there's a user group.

Starting this month, we'll be keeping *Portable 100* readers informed about the activities of user groups across the nation and globe. Here's a round up of user groups we've heard from. It's just a smattering, so we're relying on existing groups or users starting a group to let us know what's going on.

**BOSTON.** Model 100 enthusiasts in the Boston area have formed Boston.100,

now a subgroup of the Boston Computer Society. *Portable 100* talked to group member Allan Trick who reported users have met throughout the fall.

At one meeting, Maddi Durholz traveled from Westminster, MD, to discuss Radio Shack's Disk-Video Interface with the group.

Holmes Engineering personalities Larry Holmes and Bob Willard demonstrated their new Chipmunk disk drive at another of the group's sessions.

Boston.100 is looking for new members. Interested 100 users can contact the group 24 hours a day at 617-227-0170 or 617-367-8080.

**NEW YORK.** In the Big Apple, a husband and wife team, Tony and Marilyn Karp, are co-assistant sysops, monitoring three 100 bulletin boards from their Jamaica, NY, home.

"The best time to use the boards," sysop Tony Karp says, "is during supertime, 5 to 8 p.m. We get calls from all over the United States and that's the least busiest time."

The boards are free, as are the more than 1000 software programs available on them, and serve the TRS-80 Color Computer users as well as 100 owners. Karp said 100 users tend to be professionals while Color Computerists are mostly hobbyists.



*Maddi Durholz traveled to Boston to explain to Boston.100 some of the finer points of Tandy's disk-video interface.*



For data transfer only, the board phone numbers are:  
212-441-3755, 212-441-3766, or 212-441-5719.

Anyone wanting more information or help can contact the Karpis at 212-526-3151.

**PHILADELPHIA.** Moving down the East coast, we find Philly.100 (the Delaware Valley Model 100 User Group). Just about a year old, the group was formed to act as an "informal device to promote information exchange between local Model 100 users." We talked to founder Richard Ross who gave us an update on his group's activities.

Philly.100 boasts a software bank where members are free to use unlimited disk storage. Currently there are over 75 programs on disk, some unavailable elsewhere.

With Basic and assembly-language professionals as members, other members are assured good programming support.

When new products are available, demonstration and reviews are sought so members can keep abreast of the latest in hardware and software for the Model 100.

The group had a private bulletin board and electronic mail exchange but it was dropped when interest waned.

Model 100 users in the Philadelphia area are invited to drop in on one of the group's meetings (the first Saturday of every month at 11 a.m. in Center City at 1724 Chestnut Street) or contact Richard Ross at 215-567-7600, CIS ID 71226,710, or STC ID ST6125.

**NASA.** For employees at the Washington, DC, headquarters of the National Aeronautics and Space Administration, there's the NASA Telemail TRS-80 Model 100 User Group. They're an on-line group using Telemail as an informal electronic means to exchange information and programming ideas.

Says group contact Pete Smith, "NASA is a heavy user of Telemail and many of us find the 100 an ideal way to get on." However, according to Smith, the idea of using Telemail became too successful and has upset some officials.

He adds: "NASA recently waged a crackdown since traffic on the system was getting so heavy. This caused the group to slack off for awhile, but now

there are many new members. The board is still alive."

Pete Smith can be contacted by either writing or calling: Code LID, NASA Headquarters, Washington, DC 20546, 202-453-8440.

**RICHMOND** Richmond, VA, 100 users have an active group meeting monthly at the home of President Robert L. Ripley, 8140 Ammonett Drive. For the past several months, members have been studying Basic on the 100.

"Most of our members," says Ripley, "are inexperienced business people who have machines because their company's bought them one." For this reason, meetings are plugged as a way to "learn to use the full power of your machine."

There's a \$15 per year membership fee. Meetings are the second Tuesday of every month at 7:30 p.m. Ripley encourages people to call with questions. He can be reached at 804-272-1560 from 5:30 to 10:30 p.m.

**BELTWAY BANDITS** There's even a user group for federal government employees and "Beltway Bandits," government consultants. Covering a spread-out area that includes Washington, DC, Maryland, Northern Virginia, and even Hong Kong, the Northern Virginia TRS-80 Model 100 User Group (Nova 100) is "an informal gathering of electronic pen pals."

That's how leader Michael Connick describes his one year-old creation. "January (1984) saw the start of our group," says Connick. "The group's BBS system went on the air on a 24K Model 100" and "...within the first month the group consisted of 32 members."

Nova 100 has kept active this past year, reports Connick. "I get between 30 to 40 calls per day on the BBS. It's a fast-performing board." And he should know. While most BBS use Basic, Connick wrote all the software for Nova 100 in C, running the system on his Victor 9000.

All new members are validated to prevent hackers from getting into the system. In this way, Nova 100 hopes to maintain a degree of seriousness. Connick says the group is oriented towards the technically-minded and to those who want to have a serious exchange, whether it be of swapping opinions or software.

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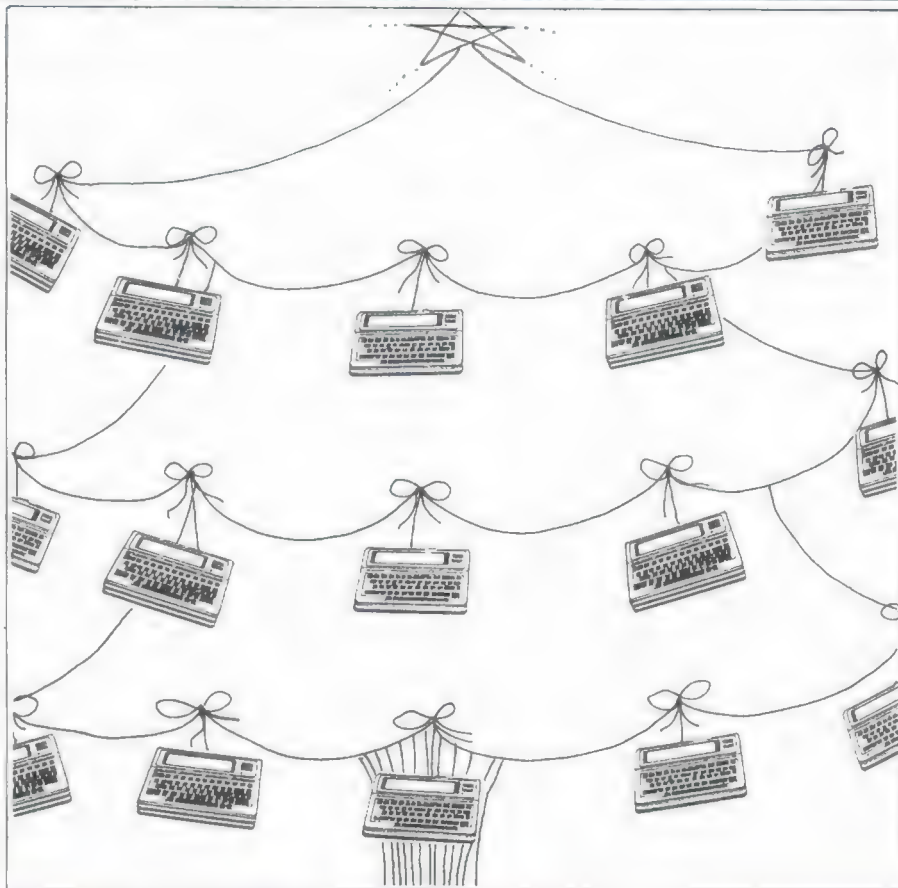
The Nova 100 BBS can be reached at 703-476-9459 from 6 p.m. to 7 a.m. EST on weekdays, and all day on weekends and holidays. The Model 100 Telcom status setting should be M711E to communicate with the BBS. Other computers should use 8 bits, no parity, 300 baud.

Michael Connick can be reached at his office number, 703-661-5173.

**DANVILLE** Danville Tigers sounds more like a softball team than a user group. But don't let the name deceive you. For 100 computerists in this town north of Los Angeles, it's the only way to problem swap. Started as a support group, the members are mostly professionals in their mid-40s.

Bill Templeton, the group's contact, says the Tigers cover a 50-mile radius with some "people even driving up from Los Angeles."

Officially formed last February, the diverse group features a retired judge and a real estate tycoon. But don't let that scare you. New members are encouraged and readers can get more information by calling Bill at 415-820-3777. ◀



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I don't think Tandy should have included a built-in ROM formatter with significant capability, but I do think the 100 should have come with the basic elements of formatted printing. As delivered, it isn't capable of printing presentable documents.

A number of third-party vendors are selling software which enhances the print-formatting capability of the 100. While many of these products refer to themselves as word processors, they're only print formatters. They do not enhance the text-editing capabilities of the 100 nor do they overcome its screen, keyboard, and storage weaknesses.

These programs have different capabilities but each gives the 100 the ability to print formatted text. They allow you to set and change margins, spacing, printer controls; to center or right justify text; to number pages; and to insert headers and footers. Some include more elaborate and complex functions such as mail merge and plotting of page format.

**NOT THE REAL THING.** These programs can do an excellent job of formatting, but many of their features are substitutes for the real thing as used by real people in the real world. Consider a few examples.

Most of these print programs can install headers, which is repeated text on the top of each page of a document. However, office environments must have flexibility in the formatting of a header. Unless the user can control format and location of a header, then the program's header feature is useless. In my office the header on correspondence looks like this:

Mr. John Mello  
December 31, 1984  
Page: 2

\*\*\*\*\*

I'm not interested in adjusting to a programmer's view of how my headers should look. From the programmer's side, giving choice takes up limited RAM. But if what is offered isn't what I can use, then the feature doesn't exist for me.

This may seem too persnickety for you, but I don't want to send a letter that's dated December 09, 1984, or has a Page: 02. However accurate 02 may

be, it looks oddball, depersonalizes the written word, and it isn't my way. It ought to look regular, and it doesn't. If computers are so smart, then let them say Page: 2. I can. And do!

**RIGHT JUSTIFICATION.** Right justification on the 100 is little more than amusing. In my world the ultimate goal of right justification isn't to have text with an aligned right margin, but rather to have neater and more attractive documents. It's a means to an end and not the end itself.

Every line of printed text includes some blank area, located between printed words and between characters in the same word. The 100 right justifies by determining what is the last word of text that can be completed before the right margin. It determines how many blank spaces would be left over at the end of the line, and instead of printing them at the end, distributes them between the words to be printed on that line. It isn't unusual to fill in more than 10 spaces because the usable word is too long and has to be dropped down to the next line. Huge and uneven gaps can appear between words when these programs right justify.

True right justification is achieved only when your printer does proportional and micro spacing, and the printing software supports that capability. Typically, such software also will allow the user to select the acceptable amount of blank space the computer will adjust. The computer can either increase or decrease spaces between characters and words, stretching them out or squeezing them together. If the right justification can't be achieved within the user's specified range, then the computer will request a hyphenation decision in order to reduce the amount of blank space. When a word processor can truly right justify, the result is remarkable.

The 100 doesn't do true right justification, and the typical result is text which is ragged between the margins rather than at the margins.

**GET HELP.** Whether or not you need word processing, it's my judgment the user should acquire one of the 100's print-formatting programs. Whatever text printing you're going to do on the 100 just can't be done decently without the help of one of them. ◀

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## NO WORD PROCESSING HERE

**T**he Model 100 is not, and never will be, a word processor. The Model 100 is a damn good laptop computer with text-editing capability and a smidgen of print-formatting power.

For those who have to record or transmit words on the run, the 100 is a good balance of portability and capability. Whether you're a journalist, police officer, or salesperson, the 100 is an effective text tool, not because of what it does, but because it does it in a box about the size of a book. And for others, who don't have a significant text need, but would occasionally like to send a letter to their mother, then the 100 will suffice.

However, for those who have significant and ongoing word-processing needs, the 100, with or without the help of commercial software, is a poor and inadequate substitute for programs run on a desk-top computer.

**NO FACADE.** If you take the 100, add on disk storage and a full-size screen, plug it into a letter-quality printer,

and run the best text formatter available, what have you got? A very expensive, third-rate word processor without portability. Buy a Macintosh or Atari, before you waste your money trying to turn the 100 into something it isn't.

This point may be lost on those who haven't had significant contact with word processing on a desk-top computer. If there is any area where computers have given immense power to ordinary people, it is word processing. It has revolutionized the written word, by affording considerable flexibility and power in text entry, manipulation, correction, printing, and storage.

The 100 can be only what it is and I, for one, wouldn't criticize it for not being a word processor. It's important, however, for users to resist the suggestion of some software vendors and of Tandy advertising that the 100 has word-processing capability.

**GETTING BY NOT ENOUGH.** So far as built-in text editing is concerned, the

100 is primitive, but good for portable purposes. Although the process is slow and cumbersome, you can enter text and scroll through it, search it, and delete, or move it.

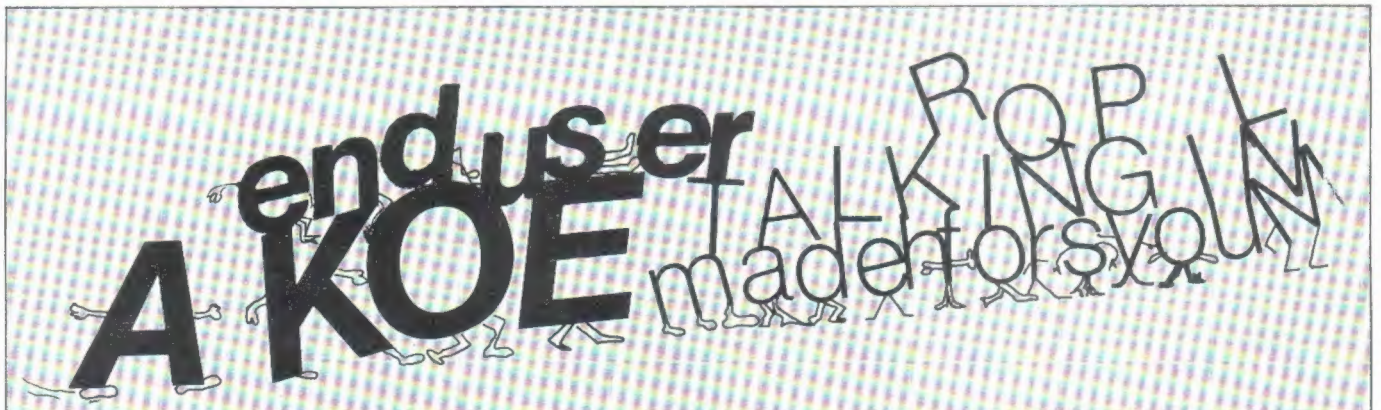
Because the screen is small and contains so little text at a time, it's more difficult to write, both from a creative and functional perspective. This column is written on a desktop because it's easier for me when I can visualize a full page of text at a time. When necessary, I can get by with the 100. I don't know about you, but *getting by* isn't my standard of product satisfaction.

Similarly, the screen intensity and clarity, as well as the keyboard, isn't suitable for people asked to do regular office typing on the 100. Significantly, the limited RAM routinely interferes with document size, and cumbersome mass storage slows down the process to a snail's pace.

**PRINT FORMATTER.** The best that can be said for the built-in, print-formatting capability of the 100 is it stinks, and that it should have been a whole lot better than what it is.

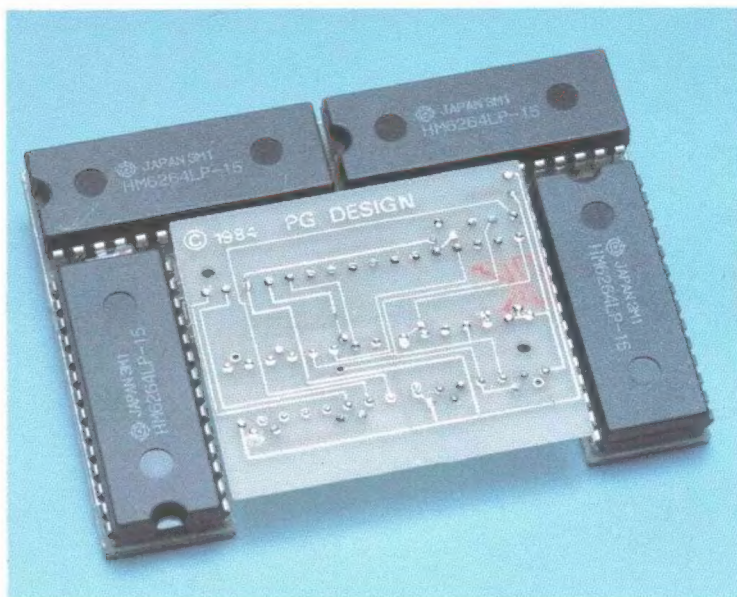
Apart from text width, nothing is controlled or formatted. The left margin always is set at zero, it won't stop at the end of the page, and prints right down to the bottom of the page, and across the crack of the next page.

*continued on page 71*





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